DENIO, ERIN B., Ph.D. Early Temperament and the Link with Adolescent Internalizing Problems: Pathways through Social Processes. (2019)
Directed by Dr. Susan P. Keane. 133 pp.

Early identification of risk factors associated with psychopathology (e.g., internalizing problems) is a primary goal for psychologists. Consistent with the concept of equifinality, research suggests that there are multiple factors that contribute to internalizing problems. Temperament factors such as social fear and inhibitory control as well as social processes including social withdrawal and peer victimization have been associated with increased risk for anxiety and depression in adolescence. However, research has neglected examining how these factors work together across development to affect risk for internalizing symptoms. The current study examined two path analyses to test whether different combinations of individual differences in temperament (i.e., social fear, inhibitory control) impact later internalizing symptoms indirectly through social processes. Social fear and inhibitory control were assessed via maternal ratings on the CBQ at age 4. Peer victimization was assessed via sociometric peer nomination when children were in 5th grade (age 10). Social withdrawal was assessed via 5th grade teacher ratings on the BASC-2. Internalizing symptoms were assessed via self-report ratings on the BASC-2 at age 15. There were significant direct effects from social withdrawal at age 10 and peer victimization at 10 on internalizing symptoms at 15. There was also a significant indirect effect of inhibitory control at 4 on internalizing symptoms at 15 through peer victimization as well as social withdrawal at 10. A multiple group path analysis revealed a three-way interaction between social fear, inhibitory control, and sex such that for females with low inhibitory control at 4, as social fear decreases, risk for

social withdrawal at 10 increases. Implications for future research examining temperament, social withdrawal, peer victimization, and adolescent internalizing symptoms are discussed.

EARLY TEMPERAMENT AND THE LINK TO ADOLESCENT INTERNALIZING PROBLEMS: PATHWAYS THROUGH SOCIAL PROCESSES

by

Erin B. Denio

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2019

Approved by

_____
Committee Chair

APPROVAL PAGE

This dissertation written by ERIN B. DENIO has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____
Susan P. Keane

Committee Members _____
Susan D. Calkins

_____
Janet Boseovski

_____
Rosemery Nelson Gray

_____
Date of Acceptance by Committee

_____
Date of Final Oral Examination

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

Adolescence is a developmental period marked by considerable changes across multiple domains (e.g., social relationships, academics, physical growth). Along with the physical and social developments that come with puberty and entry into high school, adolescence is also associated with the emergence of internalizing symptoms such as anxiety and depression (McLaughlin & King, 2015). Epidemiological studies estimate the prevalence rate of anxiety disorders in adolescents to fall between 10 and 32% (Merikangas et al., 2010). Likewise, the prevalence rate of adolescent mood disorders falls between 5 and 10% (Avenevoli, Swendsen, He, Burstein, & Merikangas, 2015; Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Characterized by dysregulated affect, teens with symptoms of anxiety and depression experience distressing levels of negative emotions such as fear, sadness, and irritability that interfere with their daily functioning. The inability to effectively control negative thoughts and emotions leads to significant impairment in academic performance and social relationships (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998; Masten et al., 2005). Internalizing symptoms are also associated with higher suicide risk (Kovacs & Devlin, 1998; Thapar, Collishaw, Pine, & Thapar, 2012), which is the second leading cause of death in American adolescents between the ages of 15 and 19 (Centers for Disease Control and Prevention, 2014). For the individuals who develop internalizing problems in adolescence, these

difficulties often persist and become more severe in adulthood (Coyne & Thompson, 2011). Adults with clinical levels of internalizing problems are more likely to experience unemployment as well as more chronic health problems (Jefferis et al., 2011; Kessler et al., 2009; Kessler, Petukhova, Sampson, Zaslovsky, & Wittchen, 2012)

Given the wide range of long-lasting, negative consequences associated with internalizing problems in adolescence, prevention is an overarching goal for psychologists. To achieve this goal, it is essential to identify early risk factors associated with internalizing problems in addition to investigating *how* these factors confer risk. But the processes through which symptoms of anxiety and depression develop are complex.

Consistent with the concept of equifinality (Cicchetti & Rogosch, 1996; Cicchetti & Toth, 2009; Toth & Cicchetti, 2013), research suggests that there are multiple pathways to the outcome of internalizing problems. That is, several different environmental and individual difference factors in children can place them at risk for later internalizing symptoms. For instance, parental depression, stressful life events, and peer victimization have each been linked with greater risk for anxiety and depression (Goodman et al., 2011; Karevold, Roysamb, Ystrom, & Mathiesen, 2009; Ladd, 2006; Reijntjes, Kamphuis, Prinzie, & Telch, 2010; Shanahan, Copeland, Costello, & Angold, 2008). There is also literature to suggest that child characteristics may positively predict later internalizing symptoms. For example, children of minority race, lower IQ, and fearful temperament tend to be at greater risk for more symptoms of anxiety and depression in later childhood and adolescence (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Lee & Hankin, 2009; Leech, Larkby, Day, & Day, 2006). Moreover, a

developmental psychopathology approach emphasizes that disorder (as well as normal development) results from innumerable interactions between individual and contextual factors at different points in time (Cicchetti & Toth, 2009). The current study highlights the importance of examining a "diversity of processes" at developmentally salient time points (Cicchetti & Rogosch, 1996) and investigates how different combinations of individual differences in temperament impact later internalizing symptoms indirectly through two social processes: social withdrawal and peer victimization.

The association between children's temperament and later internalizing symptoms has received substantial attention (Bufferd et al., 2014; Caspi, Moffitt, Newman, & Silva, 1996; Gulley, Hankin, & Young, 2016; Lonigan, Vasey, Phillips, & Hazen, 2004; Melegari et al., 2015; Muris & Ollendick, 2005; Nigg, 2006). Additionally, social factors such as social withdrawal and peer victimization have been highlighted as robust predictors of internalizing symptoms (Ladd, 2006; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). However, there are few studies that examine how different aspects of temperament interact with one another to influence social variables (Degnan, Almas, & Fox, 2010). Even fewer document how temperament and social factors work together in a process to predict later internalizing symptoms (Affrunti, Geronimi, & Woodruff-Borden, 2014). That is, social factors such as social withdrawal and peer victimization may help explain how individual temperament factors develop into internalizing problems. Thus, the current study aimed to integrate the theoretical and empirical findings relating early temperament and peer processes to internalizing symptoms in order to identify different pathways to adolescent internalizing symptoms.

Temperament

One of the most widely studied individual difference factors examined in conjunction with children's internalizing problems is child temperament (Bufferd et al., 2014; Caspi et al., 1996; Gulley et al., 2016; Lonigan et al., 2004; Melegari et al., 2015; Muris & Ollendick, 2005; Nigg, 2006). Temperament has been defined as constitutionally based, relatively stable individual differences in reactivity and self-regulation, that can be observed in the expression of emotion, behavior, and attention across different situations (Rothbart & Bates, 2006). Temperamental differences emerge in infancy and typically demonstrate some stability by toddlerhood. They are considered to have biological origins (Nigg, 2006) and can be assessed at the physiological, attentional, emotional, and behavioral levels.

The reactive dimension of temperament refers to the speed, intensity, and duration with which emotions, motor activity, and attention are activated and endured when presented with an arousing stimulus. For instance, children's initial tendencies to approach or withdraw from novel things or people falls within the reactive dimension. In contrast, the regulatory dimension of temperament pertains to how an individual uses voluntary shifting and focusing of attention to certain stimuli and inhibitory control, the ability to plan and suppress responses to stimuli, in order to regulate the reactions associated with an arousing stimulus (Rothbart & Bates, 2006). These skills are used to modulate the initial reactivity that children experience across different situations and challenges. Children's initial reactivity may also constrain or facilitate more regulatory processes. For instance, children high in temperamental inhibition or wariness tend to

have a slower speed of approach in early childhood. This slower response style allows children more time to assess situations and practice voluntarily controlling behavior. In contrast, children low in temperamental inhibition tend to develop lower levels of voluntary self-regulation (Aksan & Kochanska, 2004). Thus, regulatory and reactive aspects of temperament are inter-related and should be considered together when conceptualizing the individual differences that compose children's behavioral and emotional expressions.

A large body of research has been dedicated to examining temperamental dimensions and their association with the development of maladaptive outcomes, such as internalizing problems. However, it is less clear how reactive and regulatory aspects of temperament operate together with other variables of risk present in social situations (i.e., social withdrawal, peer victimization) to increase risk for internalizing symptoms. The study of how the reactive and regulatory dimensions of temperament work with each other as well as other systems (e.g., social processes) will contribute to developmental psychologists' understanding of typical and atypical child trajectories. One well established dimension of temperament that has been associated with later internalizing problems is behavioral inhibition.

Behavioral Inhibition and Social Fear. Behavioral inhibition (BI), a reactive component of temperament, refers to children's initial negative emotional and behavioral responses to new people or situations and emerges in the first year of life (Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984). Children high in BI tend to demonstrate wariness and withdrawal in novel contexts and with new people (Degnan et

al., 2010). Behaviorally inhibited children also show increased vigilance in new or unfamiliar places and have been described as "slow to warm up" (Kagan et al., 1984). Girls tend to be rated as having higher levels of BI compared to boys (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Olino, Durbin, Klein, Hayden, & Dyson, 2013).

As toddlers, these children may appear quiet and watchful when introduced to new people. They may also physically "cling" onto caregivers and become distressed when taken somewhere new or when interacting with unfamiliar adults or peers. Children high in BI have difficulty approaching unfamiliar children and adults, even if they are interested in joining them. For example, a child high in BI may hesitate approaching children in her preschool classroom and asking them to play. As they develop, behaviorally inhibited children tend to withdraw from social situations and often internalize thoughts of failure (Fox et al., 2005). Thus, by the time these children reach adolescence they are at greater risk for significant internalizing symptoms, especially social anxiety.

The "standard" paradigm for assessing behavioral inhibition in young children involves introducing a toddler and his mother to an unfamiliar room with unfamiliar toys. Soon after arrival, an unfamiliar adult enters the room and attempts to interact with the child. The child is observed and codes are reported for latency to approach the stranger, latency to speak to the stranger, latency to approach unfamiliar objects, and time spent close to the child's mother (Kagan, 1989; Rubin, Hastings, Stewart, Henderson, & Chen, 1997; Stifter, Fox, & Porges, 1989). Other commonly used measurement tools include parental reports on questionnaires asking caregivers to rate their child's behavior in novel

contexts (e.g., Toddler Behavior Assessment Questionnaire [TBAQ, Goldsmith, 1996], Children's Behavior Questionnaire [CBQ, Rothbart, Ahadi, Hershey, & Fisher, 2001]). Across multiple modes of measurement, BI is considered one of the most well-established precursors to internalizing symptoms, especially social anxiety (Degnan & Fox, 2007).

Some researchers have suggested that BI may consist of different forms of inhibition (Rubin et al., 1997). That is, BI may be better described as a broad term used to describe fearful and wary responses to 1) novel non-social and 2) novel social stimuli. There may be some benefit in distinguishing between the two types of inhibition. For example, some children may have a fearful response to unfamiliar people, but have no reaction to unfamiliar objects, and vice versa. Consistent with this argument, Rubin and colleagues (1997) present data suggesting that fear towards novel objects and fear of new people are not correlated in toddlers. Additionally, Kochanska and colleagues suggest that these two forms of inhibition may not be equally effective in predicting social withdrawal and other negative psychosocial outcomes (Kochanska & Radke-Yarrow, 1992). In their study, they employed the standard BI lab task, but coded social and non-social inhibition separately. That is, they coded approach and withdrawal for novel objects separately from the child's behavior once a stranger entered the room. Their results indicated that social inhibition (also referred to as social fear) at age 2 was correlated with observationally coded social withdrawal with an unfamiliar peer at age 5. In contrast, non-social inhibition at age 2 was not correlated with social withdrawal at age 5. These results suggest that there may be benefit to examining subcomponents of BI to

further elucidate the specific processes that confer risk for poorer psychosocial outcomes. The current study assessed one such subcomponent of BI by examining social fear, since this study aims to examine social constructs such as peer victimization and social withdrawal as the processes that increase risk for internalizing problems. Of note, the majority of pre-existing work has examined how broad BI relates to internalizing and social outcomes, thus the literature review references these studies, as opposed to research investigating social fear specifically.

Behavioral Inhibition and Risk for Internalizing Problems. There is substantial research documenting a positive direct link between BI assessed via laboratory based observational tasks and concurrent internalizing symptoms in preschool (Biederman et al., 2001; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007; Shamir-Essakow, Ungerer, & Rapee, 2005) as well as longitudinal associations between BI in early to mid-childhood and internalizing symptoms in adolescence (Prior, Smart, Sanson, & Oberklaid, 2000; Rankin Williams et al., 2009; van der Voort et al., 2014). Caspi and colleagues (Caspi et al., 1996) also report data from the Dunedin study suggesting that BI in preschool longitudinally predicts internalizing problems in early adulthood. They found that behaviorally coded BI at age three was longitudinally associated with clinical depression diagnoses at age 21.

A multitude of theories have been suggested to explain the mechanisms through which BI confers risk for internalizing problems. For instance, studies have identified several family-specific risk factors such as genetics and parenting behaviors. Fox and colleagues have identified a potential gene (5-HTT) that places children at greater risk for

BI in middle childhood and adults at greater risk for anxiety (Fox, Nichols, et al., 2005). Additional work (Fox, Henderson, et al., 2005; Kiel & Buss, 2010) suggests indirect pathways via controlling and overprotective parenting behaviors. Researchers argue that wary toddlers tend to elicit more protective and solicitous behaviors from parents. This increased parental attention reinforces children's fearful responses and increases children's insecurity about their ability to successfully manage new situations, increasing their risk for later internalizing problems. BI in early childhood has also been documented as an antecedent of socially withdrawn behaviors in later childhood (Rubin & Asendorpf, 1993). That is, consistent with their temperamental approach style, children high in BI avoid objects, people, or situations that they find frightening in order to cope with their feelings of fear and wariness. As a result of their avoidance, they experience relief from their initial distress and the association between the avoidance of frightening stimuli and the decrease in the aversive physiological responses is reinforced. In this way, children are conditioned to withdraw from social situations, especially children high in social fear (Fox, Nichols et al., 2005). And social withdrawal has been associated with higher rates of internalizing disorders (Coplan & Weeks, 2010; Ladd, 2006; Rubin, Burgess, Kennedy, & Stewart, 2003; Rubin, Coplan, & Bowker, 2009). Thus, BI (including social fear) may impact children's risk for anxiety and depression directly and indirectly through socially withdrawn behavior in elementary school.

Social Withdrawal

Although related to BI, social withdrawal is a distinct construct which has also been linked to later internalizing symptoms. Social withdrawal is defined as "the

consistent display (across situations and over time) of all forms of solitary behavior when encountering familiar and/or unfamiliar peers" (Rubin, Burgess, Kennedy, & Stewart, 2003, p. 376). An important distinction between BI (including social fear) and social withdrawal is that social withdrawal behaviors include avoidance of familiar people and situations. In contrast, the construct of BI highlights wariness in unfamiliar contexts. By definition, children who are socially withdrawn have fewer interactions with peers. Social withdrawal in and of itself is not a maladaptive behavior. In fact, in younger children some social withdrawal is considered normative (Rubin & Asendorpf, 1993). However, persistent social withdrawal has been directly linked with later development of peer problems and internalizing symptoms such as anxiety and depression (Coplan & Weeks, 2010; Ladd, 2006; Rubin, Burgess, Kennedy, & Stewart, 2003; Rubin, Coplan, & Bowker, 2009).

Researchers have provided empirical evidence to suggest that social withdrawal in childhood directly predicts later internalizing problems using a wide variety of assessment tools (Coplan & Armer, 2007; Katz, Conway, Hammen, Brennan, & Najman, 2011; Rubin, Hymel, & Mills, 1989). That is, social withdrawal can be assessed via peer report (e.g., Revised Class Play; Masten, Morison, & Pellegrini, 1985), observational measure (e.g., Play Observation Scale; Rubin, 2001), teacher report (e.g., items from the Teacher Report Form [TRF, Achenbach, 1991]) and parent report (e.g., Child Behavior Checklist, Achenbach, 1991). Across measurement modalities, social withdrawal in early to mid-childhood tends to consistently predict later symptoms of anxiety and depression in preadolescence (Oh et al., 2008; Rubin, Coplan, & Bowker, 2009). For instance, Rubin

and colleagues (1989) found that higher rates of behaviorally coded social withdrawal in kindergarten and first grade positively correlated with fifth grader's self-reports of depression, loneliness, and anxiety. Similarly, Boivin and colleagues (Boivin, Hymel, & Bukowski, 1995), found that peer-rated social withdrawal from the Revised Class Play in French-Canadian fourth and fifth graders predicted self-report ratings of depression and loneliness one year later. Likewise, Booth-LaForce and Oxford (Booth-LaForce & Oxford, 2008), identified trajectory patterns of social withdrawal from early childhood (first grade) to preadolescence (sixth grade) based on teacher report using the TRF (Achenbach, 1991). Children whose social withdrawal increased over time were lonelier and more depressed per self-report in sixth grade. With this research in mind, social withdrawal in childhood is a robust risk factor for later socioemotional problems in late childhood and early adolescence, even when assessed via different reporters.

Studies suggest multiple ways in which social withdrawal confers risk for internalizing symptoms including behavioral, cognitive, and affective mechanisms. For instance, in the behavioral domain, children who withdraw from social situations miss out on opportunities to learn how to interact with others. This results in less socially skilled behavior when they are around peers (Chen, DeSouza, Chen, & Wang, 2006; Stewart & Rubin, 1995), which in turn increases difficulties forming friendships (Pedersen, Vitaro, Barker, & Borge, 2007) and risk for peer adversity including peer rejection and peer victimization (Chen et al., 2006; Ladd, 2006). Cognitively, socially withdrawn children tend to view themselves as less competent in multiple domains of functioning (Hymel, Rubin, Rowden, & LeMare, 1990) and develop negative, self-blaming attributions for

their social failures (Rubin et al., 2009). Additionally, socially withdrawn children report feelings of loneliness (Hymel et al., 1990) and fears associated with social situations which in turn increase risk for internalizing problems. With these multiple mechanisms in mind, it is clear that social withdrawal in childhood represents a negative risk factor for later anxiety and depression through its impact on behavioral competence and interpersonal relationships, negative self-esteem and self-evaluations, as well as increasing feelings of anxiety and loneliness.

Due to the difficulty of completing long-term, prospective longitudinal studies, there are only a few studies examining the impact of social withdrawal in childhood on mid-to-late adolescent outcomes (Oh et al., 2008; Ollendick, Greene, Weist, & Oswald, 1990; Rubin, Chen, McDougall, Bowker, & McKinnon, 1995). One exception comes from the Waterloo Longitudinal Project (Rubin, Chen, McDougall, Bowker, & McKinnon, 1995). Rubin and colleagues found that behaviorally coded social withdrawal in the presence of same-sex age-mates in second grade was associated with self-reports of loneliness, insecurity, and negative self-evaluations in ninth grade. With anxiety symptoms as the outcome, Ollendick and colleagues (1990) found that teacher rated social withdrawal in fourth grade was positively associated with self-reported ratings of anxiety when children were in ninth grade. Clearly social withdrawal may be one mechanism through which social fear impacts later internalizing problems. But more work is needed to examine the longitudinal implications of both temperament and withdrawal on internalizing symptoms assessed in mid-to-late adolescence.

The Impact of Age and Sex on Social Withdrawal. When considering the risk posed by social withdrawal on adolescent internalizing outcomes, it is important to consider the age and sex of socially withdrawn children. As noted above, some social withdrawal at younger ages is considered normative. However, persistent social withdrawal across development leads to fewer opportunities for children to learn from social experiences and develop more sophisticated social cognition and perspective taking abilities. As such, children who display socially withdrawn behavior tend to be rated as having fewer social skills in middle childhood (Rubin et al., 2009). Substantial social withdrawal that persists into middle and late childhood becomes increasingly noticeable to the peer group. In fact, Younger et al. (1985) found that social withdrawal was considered unusual by the peer group when children reached fourth grade. That is, once children have reached middle to late childhood, peers may view socially withdrawn children as odd or deviant (Rubin & Asendorpf, 1993). In this way, relatively older children who display socially withdrawn behavior are placed at greater risk for peer adversity such as peer rejection and victimization from classmates. Peer adversity in turn leads children to develop worries of incompetence, avoid social situations, and experience loneliness (Dodge et al., 2003; Ladd, 2006; McDougall & Vaillancourt, 2015).

Regarding sex differences, social withdrawal appears to be equally prevalent in boys and girls (for review see Rubin et al., 2009). However, social withdrawal may be more harmful for boys' socioemotional development (2009). For instance, withdrawn boys in preschool are more likely to be excluded and rejected by peers than withdrawn

girls. Rubin further proposes that boys' higher rates of peer rejection may be due in part to socialization. That is, in Western communities, withdrawal appears to be more socially acceptable in females compared to males. Cultural ideas of which behaviors are acceptable for a specific sex may influence how adults and same-aged peers interact with children. Thus, boys who demonstrate socially withdrawn behavior may experience more adversity due to others' beliefs that this behavior is more deviant in boys. Through this process, boys may also receive more explicit and implicit messages that their behavior is inappropriate and a signal of deviancy, leading to the internalization of negative self-evaluations. Boys who display socially withdrawn behavior (compared to socially withdrawn girls) may be more likely to experience internalizing symptoms. Thus, high rates of social fear in toddlerhood that lead to higher rates of social withdrawal in middle childhood may place children at greater risk for adolescent internalizing symptoms, especially for boys.

Moderation of the Link between Behavioral Inhibition and Social Withdrawal. Although approximately 15% of young children demonstrate high levels of BI in toddlerhood (Fox et al., 2005), fortunately, not all of them will go on to display persistent social withdrawal and clinical levels of anxiety and depression (Degnan & Fox, 2007). Researchers have identified a variety of potential risk or resilience factors that may ameliorate or exacerbate the impact of behavioral inhibition on later internalizing symptoms. For instance, maternal sensitivity (Eggum et al., 2009) and use of early childcare (Almas et al., 2011; Fox, Henderson, Rubin, Calkins, & Schmidt, 2001) have been found to protect children from social withdrawal in the context of high BI.

Researchers argue that attentive parenting and increased opportunities to engage socially with other kids (e.g., enrollment in daycare) allows children to develop independence and self-regulatory skills which may help them overcome their initially inhibited responses and engage with peers (Eggum et al., 2009; Rubin, Cheah, & Fox, 2001). It is also possible that aspects of children's regulatory temperament (i.e., inhibitory control) may exacerbate or ameliorate the impact of their reactive temperamental tendencies (i.e., social fear) on internalizing outcomes.

Inhibitory Control

As noted above, inhibitory control is a regulatory component of temperament and refers to the ability to plan and suppress behaviors (Rueda, Posner, & Rothbart, 2005). Typically assessed during early childhood, an individual's capacity for inhibitory control increases between the ages of 2 and 3, and reflects robust individual differences by 4 (Kochanska & Knaack, 2003; Nigg, 2006). Similar to behavioral inhibition, girls tend to be rated as having higher levels of inhibitory control (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Olino, Durbin, Klein, Hayden, & Dyson, 2013). Inhibitory control is also related to delay of gratification or the ability to forgo an immediate reward (i.e., the dominant response) in order to achieve a greater goal or reward later (i.e., subdominant response). High rates of inhibitory control have been associated with a host of positive outcomes for children including fewer behavior problems (Schoemaker, Mulder, Dekovic, & Matthys, 2013), higher academic achievement (McClelland & Cameron, 2011), higher social skills (Rhoades, Greenberg, & Domitrovich, 2009), and fewer problems with peers (Eisenberg, Hofer, & Vaughan, 2007).

Some researchers suggest that skills associated with inhibitory control may also aid in an individual's coping with internalizing symptoms (Eisenberg et al., 2009; Zhou, Chen, & Main, 2012). For example, a child high in inhibitory control may also be better able to inhibit behaviors (e.g., crying, signs of anxiety) that may be ineffective ways of coping with negative emotions as well as curb initial impulses to withdraw or avoid social situations. Children high in inhibitory control may also be better able to enact more positive behaviors that facilitate adaptive socioemotional adjustment. For example, a child with higher inhibitory control may approach other children in his classroom even if he is feeling shy and use an appropriate greeting (saying hello, asking to play) before joining other children with their toys. However, results linking inhibitory control (or more broadly children's self-regulation) and later internalizing problems are inconsistent, with some studies finding a negative relationship (Bufferd et al., 2014; Eisenberg, Spinrad, et al., 2004) and others finding a positive (Murray & Kochanska, 2002) or null relationship (Dennis, Brotman, Huang, & Gouley, 2007; Volbrecht & Goldsmith, 2010).

Inconsistent results in the association may be due in part to differences in measurement of inhibitory control. That is, similar to BI, there are both observationally coded behavioral tasks as well as questionnaires available to measure inhibitory control. Some of the most frequently employed behavioral measures come from Kochanska's Effortful Control battery (Kochanska, Murray, & Harlan, 2000) and Goldsmith's Lab-TAB (Laboratory Temperament Assessment Battery; Goldsmith & Rothbart, 1996) in which tasks assess inhibitory control functions including: delaying, slowing down motor activity, suppressing/initiating activity to a signal, effortful attention, and lowering voice.

All tasks require children to suppress a dominant response in favor of a subdominant response. For example, delaying tasks require children to suppress behavior and wait for a pleasant event (e.g., wait to get a piece of candy from under a cup, wait to open a present) and slowing down tasks require children to slow down motor activity (e.g., asking children to walk as slowly as possible across a six-foot-long line). Rather than assessing specific inhibitory functions in the lab context, questionnaires assess global inhibitory control across different situations. Rothbart and colleagues have developed a series of parent and self-report questionnaires to assess inhibitory control and other aspects of temperament for infants (Infant Behavior Questionnaire, IBQ; Rothbart, 1981), toddlers (Early Childhood Behavior Questionnaire, ECBQ; Putnam, Gartstein, & Rothbart, 2006), children (i.e., Children's Behavior Questionnaire, CBQ; Rothbart et al., 2001), and adolescents (Early Adolescent Temperament Questionnaire, EATQ; Capaldi & Rothbart, 1992).

In addition to the varying methods of measurement of inhibitory control, including different control variables (such as controlling for comorbid externalizing problems) as well as neglecting to consider different contexts that may alter the relationship between inhibitory control and internalizing problems may also produce inconsistent findings concerning inhibitory control's relationship to internalizing problems (Eisenberg, Smith, Sadovsky, & Spinrad, 2004). Rather than examining inhibitory control's direct association with internalizing problems, the current study aims to assess whether inhibitory control acts as a contextual factor that impacts the relation

between reactive temperament and social factors which in turn increase risk for internalizing symptoms.

Inhibitory Control and Social Withdrawal

Although children's self-regulation is often considered adaptive, in some situations, high levels of inhibitory control may be maladaptive. For example, in a study examining the association between self-regulation and social competence in toddlers, Spinrad and colleagues (Spinrad et al., 2007) found that eighteen-month old toddlers *high* in the ability to suppress dominant behavioral responses on a delay task, tended to demonstrate greater mother-reported withdrawal at age three. Similarly, Eggum-Wilkens and colleagues found that maternal ratings of inhibitory control (on the CBQ) at age 3 were positively related to maternal ratings of socially withdrawn behavior at age 6 (Eggum-Wilkens, Reichenberg, Eisenberg, & Spinrad, 2015). This positive association between inhibitory control and social withdrawal may be especially likely for children who are already prone to controlled and inhibited behavior (i.e., high in social fear) (White, McDermott, Degnan, Henderson, & Fox, 2011).

Consistent with this theory, Fox and Henderson (2000) reported results indicating that inhibitory control moderates the link between BI and social withdrawal at age 4. Children rated as having more inhibitory control on a delay task were at greater risk for demonstrating concurrent social withdrawal as maternal ratings of BI increased. This suggests that preschoolers who demonstrate high inhibitory control and high BI may be more socially withdrawn during preschool. Indeed, in their review of the link between BI in early childhood and anxiety symptoms in school-age children and adolescents, Degnan

and Fox (2007) assert that inhibitory control may allow some children to effectively self-regulate. However, for children high in BI, it may exacerbate their reactive tendencies of wariness and focus on threat. They suggest that children high in BI may benefit more from lower inhibitory control in order to succeed in social situations. For instance, for a child who is already wary of unfamiliar social situations, having higher inhibitory control may result in more suppression of behavior and thus they may be even less likely to approach or engage with others. This "overcontrolled" child may "freeze" when introduced to new people and not speak. White et al. (2011) argue that children high in BI may be cautious around others and may worry about making mistakes. In combination with high inhibitory control they may have difficulty flexibly responding to the environment and controlling their behavior, which leads to anxious responses and social withdrawal (White et al., 2011). Thus, for some children greater inhibitory control may place them at higher risk for social withdrawal and consequent internalizing symptoms.

Importantly, there are some limitations to the few studies that have found this exacerbating effect of high inhibitory control in the context of BI (including social fear). Two limitations include the time span of the study and measurement employed. In terms of time span, Fox and Henderson (2000) employed a concurrent design that limits the generalizability of results to aspects of temperament and withdrawn behavior assessed during preschool. Similarly, Spinrad and colleagues (2007) focused on the toddler and preschool period and found positive correlations between more inhibitory control at 18 months and socially withdrawn behavior at age 3. Eggum-Wilkens et al. (2015) employed a longer longitudinal framework and examined the effect of inhibitory control (during

preschool) on shy behavior three years later (age 6). But as noted above, socially withdrawn behavior may become more concerning for the development of internalizing problems during preadolescence. Given the significance of social withdrawal at that time, it is important to evaluate whether this association with inhibitory control extends over a longer time span.

Regarding measurement, it may be important to use different reporters to test the associations between children's temperament, social withdrawal, and internalizing symptoms and reduce the effects of same-reporter bias. In fact, Eggum-Wilkens et al. (2015) caution that their reliance on the CBQ for assessment of inhibitory control and shy, socially withdrawn behavior may have inflated the positive relation between high inhibitory control and social withdrawal. They suggest that other measures of inhibitory control (e.g., Go-No-Go, delay tasks) or alternative reporters of constructs should be utilized in future studies. In contrast, Spinrad and colleagues (2007) employed a delay task in their assessment of inhibitory control and parental report of withdrawn behavior, suggesting that the effect is not completely carried by shared reporter variance.

Generally, results from these studies suggest that inhibitory control in combination with high levels of BI (including social fear) creates an "overcontrolled" response style that places children at greater risk for social withdrawal. However, studies have neglected to examine the conditional impact of early inhibitory control on social fear predicting social withdrawal occurring in preadolescence. Moreover, no studies have examined how this combination of social fear and inhibitory control indirectly impacts later internalizing symptoms through social withdrawal. Researchers have also

highlighted the need to employ different measurement modalities for aspects of temperament and social withdrawal. In order to address these limitations, the current study employs different reporters (maternal, teacher, peer, self) at each time point to assess children's temperament, social experiences, and internalizing symptoms in order to eliminate same-reporter bias. Additionally, the study tests whether inhibitory control (assessed in preschool) moderates the association between social fear (assessed in preschool) and social withdrawal occurring in preadolescence. The current study also examines whether social fear has a conditional indirect effect on adolescent internalizing problems through preadolescent social withdrawal.

Consistent with the principle of equifinality, a different combination of early risk factors (e.g., different aspects of temperament, social factors) may lead to adolescent internalizing problems. In contrast to "overcontrolled" children, youth with an "undercontrolled" temperamental profile may also be at risk for adolescent internalizing problems through a different social risk factor. That is, children who present with a more disinhibited combination of social fear and inhibitory control may be at risk for adversity (i.e., peer victimization) in preadolescence which in turn increases risk for internalizing problems in adolescence.

Peer Victimization

Peer victimization refers to when children are the recipients of negative acts (e.g., physical aggression, name-calling, malicious gossip) from one or multiple peers (Olweus, 1991). Moreover, peer victimization is relatively common, with approximately 9 to 32% of children reporting victimization by peers (Juvonen & Graham, 2014; Berger, 2007).

With this wide range of negative experiences in mind and high rate of occurrence, it is clear that peer victimization is a large source of stress for many children. It is not surprising that peer victimization has been associated with internalizing symptoms including anxiety, depression, and loneliness (Reijntjes et al., 2010).

The link between peer victimization and concurrent internalizing problems has been examined in multiple empirical studies (Boivin et al., 1995; Egan & Perry, 1998; Kumpulainen et al., 1998). In fact, a meta-analytic review from Hawker and Boulton (Hawker & Boulton, 2000) presented data from 23 studies with results indicating that peer victimization is consistently associated with contemporaneous internalizing symptoms (mean effect sizes ranged from .23 to .81) and included a variety of assessment methods for peer victimization (e.g., self-report, teacher report, sociometric nomination). Peer victimization has also been linked to longitudinal risk for internalizing problems.

In another meta-analytic study, Reijntes and colleagues (2010) reviewed 18 longitudinal studies assessing the prospective association between peer victimization and internalizing problems. Similar to the findings from Hawker and Boulton (2000), results revealed significant associations between peer victimization and later internalizing problems (mean effect sizes ranged from .12 to .24). These results indicate that longitudinal risk for internalizing problems may be smaller compared to contemporaneous risk, but still significant. Reijntes et al. (2010) also observed that most longitudinal studies employed a time frame of 12 months or less with a focus on predicting internalizing problems occurring in middle childhood (ages 7 to 10). This is unfortunate given the higher rates of internalizing problems in adolescence. Thus, more

work is needed to test whether early peer victimization has longitudinal associations with adolescent depression and anxiety.

Researchers suggest that repeated peer victimization confers risk for internalizing problems in multiple ways. For instance, a child who is the victim of peer harassment may attempt to prevent further experiences of abuse by avoiding social contexts linked to victimization (Ladd, Ettekal, & Kochenderfer-Ladd, 2019). For example, a child who is bullied at school may begin to refuse to get on the school bus, opt out of extracurricular activities, and/or even avoid using the bathroom at school due to associations with the negative peer experiences. Repeated avoidance causes children to miss out on potentially rewarding social experiences (e.g., sports games, field trips) including everyday opportunities to build friendships with peers, leading to feelings of loneliness and further social withdrawal (Ladd, Kochenderfer, & Coleman, 1997). Additionally, children may internalize the negative feedback they receive from their peers and begin to make more negative self-evaluations (Boulton, Smith, & Cowie, 2010; Goldbaum, Craig, Pepler, & Connolly, 2007). Ladd and Troop-Gordon (Ladd & Troop-Gordon, 2003) suggest that overt verbal and physical abuse by peers causes children to fear and distrust peers, which in turn increases feelings of sadness and social isolation. In this way, repeated experiences of peer victimization lead to increases in social withdrawal, negative emotions, worries of social incompetence, low self-esteem, sadness, and other symptoms of internalizing disorders (Reijntjes et al., 2010).

The Impact of Age and Sex on Peer Victimization. Similar to social withdrawal, the age and sex of the victimized child may be important to consider. Upon

school entry, peer victimization tends to elicit aggression from young children as they attempt to retaliate and prevent future peer abuse (Ostrov, 2010). But as children age, the correlation between peer victimization and ratings of aggression decreases. Instead, peer victimization in later childhood increases emotional distress and has been associated with later internalizing problems (Boivin et al., 1995; Hodges, Boivin, Vitaro, & Bukowski, 1999). Moreover, research indicates that rates of peer victimization increase in preadolescence. In their review of predictors of peer victimization, Hong and Espelage (2012) indicate that peer victimization increases during late childhood and middle school and decreases during the high school years. They argue that as children approach middle school, they attempt to establish higher status in the peer group via verbal and physical aggression which results in higher rates of peer victimization in preadolescence. These data indicate that like social withdrawal, preadolescence may be a particularly salient time to assess peer victimization's impact on internalizing outcomes.

Regarding sex differences for the impact of peer victimization on internalizing problems, empirical findings have been somewhat mixed. Some studies do not find sex differences in the effect of peer victimization on internalizing outcomes in adolescence (Schwartz, Lansford, Dodge, Pettit, & Bates, 2015). However, other researchers have found differences, such that girls are more likely to develop symptoms of anxiety and depression in the context of peer victimization (Sentse, Prinzie, & Salmivalli, 2017; Thompson & Leadbeater, 2013). Some have asserted that girls are more susceptible to experiencing distress related to social problems (Nolen-Hoeksema & Girgus, 1994). For instance, Stice et al. (Stice, Ragan, & Randall, 2004) report results suggesting that low

levels of peer support have a stronger positive relation with adolescent depressive symptoms in girls compared to boys. They argue that forming close, positive relationships with peers is of higher importance to girls. Moreover, there may be more consistent sex differences when examining specific forms of peer victimization (i.e., relational victimization, physical victimization) and the link with internalizing problems. For instance, physical victimization is much less common in preadolescent females, but for the girls who experience physical victimization they may be at the greatest risk for later psychopathology (Thompson & Leadbeater, 2013). Overt peer abuse as opposed to peer rejection alone may be especially distressing to females and can lead to more intense worries, sadness, loneliness, and negative self-evaluations. Thus, peer victimization in middle childhood may place children at greater risk for adolescent internalizing symptoms, especially for girls.

Inhibitory Control and Peer Victimization. In addition to age and sex as risk factors, aspects of temperament may also place children at risk for peer victimization, and in turn, internalizing problems. That is, in contrast with children who display an "overcontrolled" behavioral style, children with a more "undercontrolled" approach to peers may be at greater risk for peer victimization in middle childhood. Children with deficits in inhibitory control may have difficulty controlling their impulses (e.g., grab a classmate's toys, hit a peer when they do not get their way) in addition to having difficulty enacting appropriate behavior. For example, they may not follow the rules of a game and have trouble making appropriate social overtures to join other children (e.g., greeting others, asking to play). They may also be more likely to display negative

emotional responses such as yelling or crying when faced with a new or stressful situation (e.g., losing a game). This leads to less socially skilled and, at times, irritating behavior. In this way, children who have lower levels of inhibitory control are more likely to be picked on by peers. In contrast, children with high inhibitory control are better able to successfully cooperate with others by suppressing individual impulses and activating behaviors that facilitate more positive social interactions.

This link between individual differences in inhibitory control and peer victimization has been examined empirically as well. In general, researchers have found that children rated as having higher inhibitory control tend to be less likely to experience peer victimization (Hanish et al., 2004; Iyer, Kochenderfer-Ladd, Eisenberg, & Thompson, 2010). This has been found in longitudinal samples as well. For instance, Kelly and colleagues (Kelly, Schwartz, Gorman, & Nakamoto, 2008) found that self-regulation in third and fourth grade assessed via teacher report on the Emotion Regulation Checklist (Shields & Cicchetti, 1997) was negatively associated with peer victimization both concurrently and longitudinally one year later. Likewise, Bierman, Kalvin, and Heinrichs (Bierman, Kalvin, & Heinrichs, 2015) reported that dysregulated behavior in kindergarten predicted greater rates of peer victimization in second through fourth grade, which in turn predicted higher rates of depression in seventh grade. They found that parent reported dysregulation in kindergarten positively predicted a latent variable consisting of standardized sociometric ratings of peer victimization from second, third, and fourth grade. The peer victimization latent variable in turn predicted greater scores on self-reported depression when children were in seventh grade. Overall, deficits

in inhibitory control have been linked to increased risk for peer victimization and indirect risk for internalizing problems. Thus, low rates of social fear in combination with lower rates of inhibitory control in early childhood may place children at greater risk for peer victimization in middle childhood. Peer victimization in turn increases risk for adolescent internalizing symptoms, especially for girls.

Pathways from Early Temperament to Adolescent Internalizing Problems

In sum, review of literature linking temperament and social processes to internalizing outcomes, reveals multiple potential pathways to adolescent anxiety and depression. On the overcontrolled path, children's early differences in social fear may increase direct risk for internalizing problems in adolescence, as well as indirect risk via greater rates of socially withdrawn behavior in preadolescence. Additionally, children high in social fear who also display high levels of inhibitory control in preschool may have difficulty overcoming their initial wary and fearful tendencies. They may have a hard time responding flexibly to different social situations (e.g., approaching new peers, engaging in unstructured playtime with classmates) and be placed at even greater risk for social withdrawal and, in turn, internalizing problems. Importantly, research suggests that girls tend to be rated as displaying higher BI as well as higher inhibitory control. This indicates that girls may be more likely to develop internalizing problems on this "overcontrolled" pathway via social withdrawal compared to boys. However, for the boys who do develop social withdrawal in middle childhood they may experience more severe symptoms of internalizing problems due to stigma that socially withdrawn behavior is

more deviant in males compared to females. See Figure 1 for an illustration of this hypothesized overcontrolled pathway.

On the undercontrolled path, children with low social fear and low inhibitory control in preschool may exhibit impulsive and less socially skilled behavior. These children may easily approach peers, but display irritating, aggressive, and immature behaviors. For instance, they may grab things, yell inappropriately, and have difficulty transitioning from one activity to another. As such, these children may be viewed as annoying and/or weaker playmates, placing them at greater risk for peer victimization. Peer victimization in preadolescence in turn predicts more internalizing problems in adolescence. In contrast with the overcontrolled pathway, research suggests that boys tend to be rated as displaying lower BI and less inhibitory control. This suggests that boys may be more likely to develop internalizing problems on this "undercontrolled" pathway via peer victimization. However, for the girls who do experience preadolescent peer victimization they may experience more severe symptoms of internalizing problems due to heightened sensitivity to peer problems. See Figure 2 for an illustration of this theoretical undercontrolled pathway.

Central to these models is the understanding that temperament is dimensional and multi-faceted, involving both reactive and voluntary control of multiple processes (e.g., attention, behavior, emotion) that may have different relations to socioemotional outcomes such as internalizing symptoms, social withdrawal, and peer victimization. Despite establishing existing links between early temperament, social withdrawal, peer victimization, and internalizing problems, no studies have examined all of these factors

within the same long-term longitudinal model or through a mediational framework. Given the immense cost of anxiety and depression at the individual and societal level, studies aimed at clarifying how identified risk factors impact later internalizing problems are needed.

Study Goals and Hypotheses

The aim of the current study is to further elucidate the relations between young children's temperament, peer processes in preadolescence, and adolescent internalizing symptoms. Specifically, the aims of this study are twofold. First, this study aims to test the direct and indirect effects of social fear at age 4 on adolescent internalizing symptoms (age 15) through social withdrawal in preadolescence (age 10). Importantly, it is hypothesized that inhibitory control measured at age 4 will moderate the relation between social fear and social withdrawal, which in turn would be associated positively with adolescent internalizing symptoms. Additionally, it is hypothesized that sex will moderate the relation between social withdrawal in preadolescence and adolescent internalizing problems. Second, the study plans to test another pathway from social fear to internalizing symptoms through peer victimization. The study will also evaluate whether inhibitory control at age 4 will moderate the relation between social fear and peer victimization, which in turn would be associated with adolescent internalizing symptoms. Finally, it is proposed that sex will moderate the relation between peer victimization in preadolescence and adolescent internalizing problems.

Consistent with previous work suggesting that children's temperament reflects reliable individual differences by preschool (Nigg, 2006), age 4 was chosen as the

optimal measurement point for the predictor variable (social fear) and moderator variable (inhibitory control) in this longitudinal design. Moreover, age 4 marks a period of time where many children enter preschool and are now faced with the challenge of forming friendships and responding appropriately to other adults. The emergence of inhibitory control during this time period may be especially important for forming positive relationships with others that impacts social factors in later childhood (Olson & Rosenblum, 1998; Sroufe & Rutter, 1984). Due to research suggesting that social withdrawal and peer victimization become more salient to children during mid-to-late elementary school, age 10 was chosen as the age of assessment for the mediating variables. Moreover, as the overarching goal of this study is to identify potential relations between temperament and social factors for internalizing problems emerging in adolescence, age 15 was chosen as the outcome measurement point.

Aim 1: Test the Overcontrolled Pathway. Evaluate the Direct and Indirect Influence of Social Fear in Early Childhood in the Context of Children's Inhibitory Control on Adolescent Internalizing Symptoms through Social Withdrawal in Preadolescence

Direct Effects.

1a. Higher social fear at age 4 will predict greater internalizing symptoms at age 15.

1b. Higher social fear at age 4 will predict higher social withdrawal symptoms at age 10.

1c. Greater social withdrawal at age 10 will predict greater internalizing symptoms at age 15.

Moderating Effects.

1d. Inhibitory control at age 4 will moderate the relation between social fear at age 4 and social withdrawal at age 10, such that children with the highest levels of social fear and highest levels of inhibitory control will have the most symptoms of social withdrawal.

1e. Sex will moderate the relation between social withdrawal at age 10 and internalizing symptoms at age 15, such that boys with higher rates of social withdrawal will be at greater risk for internalizing problems compared to girls.

Indirect Effects.

1f. Social fear will have an indirect effect on adolescent internalizing problems through social withdrawal at age 10. Additionally, children who present with higher inhibitory control in combination with higher social fear at 4 will be at even greater risk for social withdrawal at age 10 and which in turn increases their risk for internalizing at 15. See Figure 3 for an illustration of this statistical model.

Aim 2: Test the Undercontrolled Pathway. Evaluate the Indirect Influence of Social Fear in Early Childhood in the Context of Children's Inhibitory Control on Adolescent Internalizing Symptoms through Peer Victimization in Preadolescence

Direct Effects.

2a. Social fear at age 4 will not be significantly associated with peer victimization.

2b. More peer victimization at age 10 will predict greater internalizing symptoms at age 15.

Moderating Effects.

2c. Inhibitory control at age 4 will moderate the relation between social fear at age 4 and peer victimization at age 10, such that children with the lowest levels of social fear and lowest levels of inhibitory control will have the most peer victimization.

2d. Sex will moderate the relation between peer victimization at age 10 and internalizing symptoms at age 15, such that girls with higher rates of peer victimization will be at greater risk for internalizing problems compared to boys.

Indirect Effects.

2e. Under conditions of low inhibitory control, social fear will have an indirect effect on adolescent internalizing problems through peer victimization at age 10, such that children who present with lower inhibitory control and lower social fear at 4 are at greater risk for peer

victimization at age 10 and which in turn increases risk for internalizing at 15. See Figure 4 for an illustration of this statistical model.

The current study contributes to the extant literature by using a long-term longitudinal design spanning 11 years of development as well as examining reactive and regulatory aspects together with developmentally salient social problems in the same study. In sum, this research contributes a more comprehensive conceptualization of how distinct individual differences interact with one another and influence social processes to longitudinally impact the development of adolescent internalizing problems.

CHAPTER II

METHODS

Recruitment and Attrition

The current study utilized data from three cohorts of children who are part of an ongoing longitudinal study of social and emotional development. The goal for recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems, and who were representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992), completed by the mother, in order to over-sample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females. This recruitment effort resulted in a total of 307 children. Cohort 3 was initially recruited when infants were 6 months of age (in 1998) for their level of frustration, based on laboratory observation and parent report, and were followed through the toddler period (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children from Cohort 3 whose mothers completed the CBCL at

two-years of age were then included in the larger study ($N = 140$). Of the entire sample ($N = 447$), 37% of children were identified as being at risk for future externalizing problems.

Of the 447 originally selected participants, six were dropped because they did not participate in any data collection at 2 years old. An additional 12 families participated at recruitment, did not participate at two-year, but did participate at later years. At 4 years of age, 399 families participated. Families lost to attrition included those who could not be located, moved out of the area, declined participation, or did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate at age four in terms of gender, χ^2 (1, $N = 447$) = 3.27, $p = .07$, race, χ^2 (1, $N = 447$) = .65, $p = .42$, two-year SES, t (432) = -.92, $p = .36$, or 2-year externalizing T score, t (445) = .45, $p = .65$. At age 10, 357 families participated. Again, no significant differences were noted between families who did and did not participate in the 10-year assessment in terms of child gender, χ^2 (1, $N = 447$) = 3.31, $p = .07$; race, χ^2 (3, $N = 447$) = 3.12, $p = .08$; 2-year SES, t(432) = .02, $p = .98$; or 2-year externalizing T score, t (445) = -.11, $p = .91$. At age 15, 327 families participated, including 27 families that did not participate in the 10-year assessment. There were no significant differences between families who did and did not participate in the 15-year assessment in terms of race χ^2 (3, N = 447) = 3.96, $p = .27$; 2-year SES t (432) = -.56, $p = .58$; or 2-year externalizing T score t (445) = .24, $p = .81$. Boys were less likely to participate in the 15-year assessment χ^2 (1, N = 447) = 9.31, $p = .002$.

Study Sample

This study utilized a portion of the larger sample (N = 414, 53% female) that completed study measures for at least one time point of the model (age 4, age 10, and age 15). Missing data were accounted for through full information maximum likelihood (FIML). Sixty-seven percent of the sample was European American, twenty-seven percent African American, four percent biracial, and two percent other. Families were economically diverse based on Hollingshead (1975) scores at the 4-year assessment, with a range from 14 to 66 (M = 39.79, SD = 10.94) thus representing families from each level of social strata typically captured by this scale.

Procedures

Each child and one parent, usually the child's mother, participated in an ongoing longitudinal study beginning when children were two years old. The current study includes data collected when children were 4, 10, and 15 years old. Data collection was led by trained graduate students and research assistants. Consent was collected by experimenters at each laboratory visit prior to the start of the assessments. Consent for sociometric data collection was collected from the local superintendent, the principal, participants' teachers, and the parents of participants' classmates. Sociometric interviews were conducted at participants' schools with their fifth grade classmates. Questionnaires were collected from parents, children, and teachers in regards to the child's current functioning. Data resulting from mother, child, and teacher questionnaires as well as sociometric nominations were utilized for analysis in the current study.

Materials

Social Fear. The current study measured social fear at age 4 via the Shyness subscale on the 195-item Children's Behavior Questionnaire-Long Form (CBQ-LF, Rothbart et al., 2001). On the CBQ-LF, mothers rate items about their child's reaction to a variety of situations and decide to what extent each item is true or untrue. Each item is rated on a scale from 1 to 7, with the additional option of selecting "N/A" for "Not Applicable." A response of "1" indicates "Extremely Untrue," a response of "4" indicates "Neither True nor Untrue," and a response of "7" indicates "Extremely True." The Shyness subscale consists of an average of 13 items and measures the child's fear and discomfort in social contexts. Higher scores indicate higher social fear. Sample items include, "sometimes seems nervous when talking to adults s/he has just met" and "acts shy around new people." See Appendix B for the full list of items. Internal reliability of this scale is adequate (Cronbach's alpha = .92).

Inhibitory Control. The current study assessed inhibitory control at age 4 via maternal report on the Inhibitory Control subscale on the 195-item Children's Behavior Questionnaire-Long Form (CBQ-LF, Rothbart et al., 2001). Each item is rated on a scale from 1 to 7, with the additional option of selecting "N/A" for "Not Applicable." A response of "1" indicates "Extremely Untrue," a response of "4" indicates "Neither True nor Untrue," and a response of "7" indicates "Extremely True." The Inhibitory Control subscale consists of an average of 13 items that tap the child's ability to suppress impulses and plan ahead. Higher scores indicate higher inhibitory control. Sample items include, "can easily stop an activity when s/he is told 'no'" and "Is able to resist

temptation when told s/he is not supposed to do something." See Appendix C for the full list of items. Internal reliability of this scale is adequate (Cronbach's alpha = .76).

Social Withdrawal. Social withdrawal was measured at age 10 using the Withdrawal subscale from the Teacher Rating Scale of the Behavior Assessment System for Children Second Edition for children (BASC2-TRS-C, Reynolds & Kamphaus, 1998). The Withdrawal subscale is composed of 8 items that assess behaviors such as solitary play and avoidance of peers. Sample items include, "refuses to join group activities" and "plays alone." See Appendix D for the full list of items. Teachers rate the frequency of children's behavior on a three-point scale. A response of "0" indicates "Never," a response of "1" indicates "Sometimes," and a response of "2" indicates "Almost Always." Combined sex T-Scores were used with higher scores indicating more social withdrawal (Cronbach's alpha = .86).

Peer Victimization. Peer victimization was assessed using unlimited nomination, cross-sex sociometric peer nomination procedure (Coie, Dodge, & Coppotelli, 1982). When participants were in the fifth grade, consenting classmates were individually interviewed and told, "Some kids get picked on and made fun of by other kids. They get teased or get called names. Who gets picked on and teased by other kids?" Participants' total nominations were then standardized within their fifth grade class. Thus, a score of "0" indicates that participants received an average amount of nominations from their classmates (compared to other peers' nominations in their class). Likewise, a score of "1" indicates that participants received more nominations (one standard deviation above the mean) of being picked on compared to their classmates. As sociometric data is the

product of multiple informants, unlimited peer nomination data tends to have high reliability (Babcock, Marks, Crick, & Cillessen, 2014).

Internalizing Symptoms. The outcome variable, internalizing symptoms, was assessed by adolescent self-report at age 15 via an average T-Score of the Social Stress, Anxiety, and Depression subscales on the self-report form of the Behavior Assessment System for Children Second Edition (BASC2-SRP-A, Reynolds & Kamphaus, 1998). These scales represent the SAD Triad and assess feelings of depressed mood, nervousness, negative self-evaluations as well as distress about social situations. High scores on the SAD Triad indicate significant internalizing problems and emotional distress. Sample items include, "Nothing is fun anymore," "I feel depressed," "I worry a lot of the time," and "I am lonely." See Appendix E for the full list of items. Adolescents are asked to report whether experiences are "True" (scored as "1") or "False" (scored as "0") for some items. For other items they are asked to report the frequency of experiences on a 0 to 3 scale. A response of "0" indicates "Never," a response of "1" indicates "Sometimes," and a response of "2" indicates "Almost Always." Average Combined Sex T-Scores scores were used with higher scores indicating more internalizing problems (Cronbach's alpha = .78).

CHAPTER III

RESULTS

Data Analytic Plan

Preliminary analyses were conducted using SPSS version 23. Two methods were used to handle missing data. First, data from the CBQ-LF were imputed at the single item level to account for missing items (e.g., a mother chose not to answer certain questions, accidentally skipped items). Imputation was completed by removing all cases with completely missing data and using the expectation maximization (EM) method to impute at the item level for the remaining participants. Full information maximum likelihood (FIML) in Mplus 8 was used to handle data missing at the measure level (e.g., a child's teacher did not fill out the BASC-2, a family did not participate in 15-year visit). FIML makes use of all available data to produce unbiased estimates. Preliminary analyses included running correlations and descriptive statistics on all study variables as well as assessing normality of data.

After the completion of preliminary analyses, main analyses were completed in Mplus 8 (Muthén & Muthén, 2017). Two moderated mediational path analyses (i.e., overcontrolled model, undercontrolled model) were examined following the procedures described by Hayes (Hayes, 2013) as adapted for Mplus by Stride and colleagues (2015). A bias-corrected boot strapping procedure (10,000 draws) was used to test the indirect effects of temperament on internalizing outcomes through social processes.

Bootstrapping is effective in generating accurate confidence intervals for indirect effects while reducing Type 1 error and increasing statistical power (Mackinnon, Lockwood, & Williams, 2004). Additionally, as the bootstrapping method creates standard errors by taking the distribution of data into account, bootstrapped estimates are robust to mildly to moderately non-normal data (Finney & DiStefano, 2013). Model fit was evaluated using several indices including the chi-square difference test, the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMSR). It is recommended that the chi-square test should be nonsignificant, the RMSEA should be less than .06, the CFI should be greater .95, and the SRMSR should be less than .08 (Hu & Bentler, 1999). When fit was poor, modification indices provided by Mplus 8 were examined to guide the elimination of paths to improve model fit. Multiple group analyses by sex were conducted to address poor model fit and Wald Chi Square difference tests were used to examine moderating effects on paths by sex. Significant interaction effects were probed in Mplus 8 using the simple slope analysis procedures described by Aiken and West (1991). Finally, a power analysis was conducted using Monte Carlo simulations in order to assess whether the current sample size has enough power to detect effects in both the overcontrolled and undercontrolled models.

Preliminary Analyses

Descriptive statistics are provided in Tables 1 and 2 for all study variables. Due to the study's aim to assess whether paths from social variables (social withdrawal, peer victimization) to internalizing symptoms vary by sex, descriptive statistics and

correlation analyses are presented separately for boys (N = 193, Table 1) and girls (N = 221, Table 2). Significant skew and kurtosis were observed for peer victimization for both boys (skew = 2.63, kurtosis = 7.79) and girls (skew = 2.16, kurtosis = 6.34). Approximately 69% of the total sample had an average number or fewer of nominations as someone who gets "picked on and teased by other kids" compared to their classmates. Likewise, 31% of the full sample received more than average number of nominations compared to their classmates, with 3% of the sample receiving total nominations that were at least 3 standard deviations above their class's mean. Variable transformations were not conducted on peer victimization as doing so may distort the relations among the variables when conducting path analyses (Gao, Mokhtarian, & Johnston, 2008). Additionally, analyses completed using maximum likelihood estimation with bias corrected bootstraps in Mplus work well with non-normal data due to the creation of standard errors based on the distribution of the data (Finney & DiStefano, 2006). All other study variables were normally distributed for both sexes.

T-tests and ANOVAs were conducted to assess for potential sex and race differences, respectively, across the study variables. One significant sex difference was found such that girls were rated as possessing higher inhibitory control than boys (t (372)= -4.19, $p < .000$). No other sex differences were observed among study variables. One-way ANOVAs revealed no significant differences among study variables by race.

Correlations among variables were also examined. See tables 3 and 4 for correlations for males and females separately. Correlations for male participants are presented first. A significant negative correlation between SES and social withdrawal

reveals males from families reporting lower SES exhibit more teacher-rated social withdrawal in fifth grade. For this reason, SES at age 4 is entered as a covariate in all models estimating parameters with social withdrawal. Additionally, inhibitory control and social fear at 4 were significantly positively associated indicating that males rated as having higher social fear at 4 were also rated higher in inhibitory control. Social withdrawal at 10 was significantly and positively associated with peer victimization at 10 and internalizing symptoms at 15. This suggests that for males, higher rates of social withdrawal at age 10 were associated with higher rates of concurrent peer victimization as well as longitudinal internalizing symptoms at 15. There were no other significant correlations for male participants.

Correlations with the subset of female participants indicate some patterns consistent with the male participants as well as some differences. In contrast with male participants, SES was not correlated with social withdrawal. There was also no significant correlation between social fear and inhibitory control for females. Additionally, in contrast with the male sample, inhibitory control was significantly and negatively associated peer victimization at 10 and internalizing symptoms at age 15. This indicates that for girls, lower rates of inhibitory control at 4 are associated with higher rates of peer victimization at age 10 as well as higher rates of internalizing problems at age 15. Consistent with the male sample, social withdrawal at 10 was significantly and positively associated with peer victimization at 10 and internalizing symptoms at 15. This suggests that higher rates of social withdrawal at age 10 are associated with higher rates of concurrent peer victimization as well as longitudinal internalizing symptoms at 15.

Peer victimization at 10 was also significantly and positively associated with internalizing symptoms at 15 for females. This suggests that for girls, higher rates of peer victimization at 10 are associated with more internalizing problems at age 15.

Surprisingly, the correlation between females' inhibitory control and social withdrawal was in the opposite expected direction. That is, inhibitory control was significantly and negatively associated with teacher-reported social withdrawal at 10 for females. This suggests that for girls, lower rates of inhibitory control at 4 are associated with higher social withdrawal at age 10.

Main Analyses

Aim 1: Overcontrolled Model. To assess the effects of social fear in the context of high inhibitory control on social withdrawal and adolescent internalizing symptoms, the "overcontrolled" path model was estimated. The overcontrolled model demonstrated very poor fit (χ^2 [6] = 211.47, p = .00; RMSEA = .29; CFI =.14; SRMR = .11). Thus, parameter estimates are not interpreted here. In order to address poor model fit, fit diagnostics were run in Mplus. Fit diagnostics indicated that model fit would improve by removing the interaction term of sex X social withdrawal. Higher estimated standard errors in the model indicated that the interaction term of sex by social withdrawal was increasing multicollinearity. A multiple group analysis by sex was considered as an alternative method to assess moderation by sex on the path from social withdrawal at 10 to internalizing symptoms at 15. Behavioral researchers have recommended employing a multiple group analysis as an appropriate way to assess moderation effects in Mplus, especially when examining a categorical moderator such as sex (Ryu, 2015). First, a

model with all parameters constrained to be equal for males and females was estimated and interpreted. Then a Wald Chi Square Difference test was conducted to determine whether sex moderates the association between social withdrawal at age 10 and internalizing symptoms at age 15. When the overcontrolled model was run as a fully constrained multiple group analysis, there was good model fit (χ^2 [14] = 14.073, p = .44; RMSEA = .01; CFI = .99; SRMR = .05).

Direct Effects. As hypothesized, in this fully constrained model teacher reported social withdrawal at 10 was significantly and positively predictive of self-reported internalizing symptoms at age 15 (boys: β = .26, S.E. = .08; girls: β = .30, S.E. = .08; *ps* < .01). This suggests that as teacher ratings of social withdrawal increased when children were 10, adolescents were more likely to report more internalizing problems at age 15. Additionally, maternal reported inhibitory control at age 4 was significantly and negatively predictive of teacher reported social withdrawal at 10 (boys: β = -.19, S.E. = .06; girls: β = -.19, S.E. = .07; *ps* < .01). This indicates that as maternal report of children's inhibitory control decreased at age 4, teachers were more likely to rate more social withdrawal at age 10. Consistent with male correlational analyses, SES at age 4 was also significantly and negatively predictive of social withdrawal at 10 (boys: β = -.14, S.E. = .06; girls: β = -.16, S.E. = .06; *ps* < .05). This suggests that children with families that reported lower SES when they were 4 were rated as more socially withdrawn by their teachers at age 10. There was also a significant interaction between social fear and inhibitory control at age 4 predicting social withdrawal at 10 for girls but not for boys (boys: β = .12, S.E. = .06, p = .051; girls: β = .12, S.E. = .05, p = .037). All

other paths in this model were not significant. See Figure 5 for an illustration of this model.

Moderating Effects. In order to test the hypothesis that the association between social withdrawal and internalizing symptoms is moderated by sex, this constrained model where the parameters were set to equal in males and females was compared to a baseline model in which the path coefficient of the association from social withdrawal at 10 to internalizing symptoms was free to be estimated for males and females. The Wald Chi Square Difference test was used to determine if the freely estimated baseline model fit the data better. The test ($\Delta\chi^2$ [1] = 0.31, p = ns) was not significant, suggesting that the coefficient for this path does not differ significantly for males and females. Contrary to the study's hypothesis, socially withdrawn boys were not placed at more risk for adolescent internalizing problems compared to girls.

Given the slight difference in significance levels between boys (p = .051) and girls (p = .037) for the interaction between social fear and inhibitory control at age 4 predicting social withdrawal, a Wald Chi Square Difference test was completed to assess whether this moderating effect differs by sex. A significant Wald test would indicate a three-way interaction between social fear, inhibitory control, and sex predicting social withdrawal at age 10. When the interaction term was free to be estimated for males and females, there was good model fit (χ^2 [13] = 10.121, p = .66; RMSEA = .00; CFI = 1.00; SRMR = .04). See Figure 6 for an illustration of this baseline model with parameter estimates. The Wald Chi Square difference test ($\Delta\chi^2$ [1] = 3.95, p < .05) between this baseline model and the fully constrained model, suggests that the coefficient for this path

differs significantly for males and females and allowing this parameter to be freely estimated for boys and girls would be a better fit to the data. When this path is allowed to be freely estimated, there is no significant interaction for boys (β = -.01, S.E. = .08, p = .94). For girls, the interaction remains significant (β = .22, S.E. = .07, p < .01). Thus, a simple slope analysis was conducted with the subset of females in the dataset using the guidelines developed by Aiken and West (1991). Surprisingly, simple slope analyses revealed that for girls with low inhibitory control (one standard deviation below the mean) (β = -.25, S.E. = .12, p < .05), as social fear decreased they were more likely to demonstrate social withdrawal at age 10. The moderation is not significant at medium (β = -.04, S.E. = .08, p = .61). or high (β = .17, S.E. = .11, p = .10) levels of inhibitory control. See Figure 7 for a graph of the simple slopes.

Indirect Effects. In order to test the hypothesis that social fear has an indirect effect on adolescent internalizing symptoms, through social withdrawal as well as a moderated indirect effect in combination with inhibitory control, indirect effects were examined. As the model fit better when allowing the interaction term between social fear and inhibitory control to be freely estimated for boys and girls, indirect effects were tested in this baseline model. As tests of indirect effects generate product terms that are assymetrically distributed (as opposed to normally distributed), standard significance testing is biased. Thus, bias-corrected bootstrap confidence intervals of the unstandardized parameter estimates are reported here as opposed to significance levels. Confidence intervals that do not contain the value of 0 indicate significant indirect effects. Unstandardized parameter estimates of the indirect effects and 95% bias-

corrected bootstrap confidence intervals are listed in Table 5. Inhibitory control was negatively related indirectly to internalizing symptoms at 15 through social withdrawal at age 10 (B = -.56; 95% CI: [-1.24 – -0.14]). This suggests that lower maternal ratings of children's inhibitory control at 4 were associated with higher internalizing symptoms in adolescence, through the increased risk for social withdrawal at age 10. Contrary to the study's hypotheses, there was no indirect effect of social fear on internalizing symptoms at 15 through social withdrawal at 10. There was also no conditional indirect effect of social fear in combination with inhibitory control on internalizing symptoms at 15 through social withdrawal at 10 for girls or boys.

Aim 2: Undercontrolled Model. To assess the effects of social fear in the context of children's inhibitory control on peer victimization and adolescent internalizing symptoms, the "undercontrolled" path model was estimated. The undercontrolled model also demonstrated very poor fit (χ^2 [5] = 198.78, p = .00; RMSEA = .30; CFI =.07; SRMR = .12). Thus, parameter estimates are not interpreted here. In order to address poor model fit, fit diagnostics were employed as noted above. Similarly, fit diagnostics indicated that model fit would improve by removing the interaction term of sex by peer victimization. Thus, a multiple group analysis by sex was employed as an alternative method to assess moderation by sex on the path from peer victimization at 10 to internalizing symptoms at 15. First, an undercontrolled model with all parameters constrained to be equal for males and females was estimated and interpreted. Then a Wald Chi Square Difference test was conducted to determine whether sex moderates the association between peer victimization at age 10 and internalizing symptoms at age 15.

When run as a fully constrained multiple group analysis, there was adequate model fit (χ^2 [12] = 12.93, p = .37; RMSEA = .02; CFI = .93; SRMR = .06).

Direct Effects. As hypothesized, in this fully constrained model, sociometric peer victimization at 10 was significantly and positively predictive of self-reported internalizing symptoms at age 15 (boys: β = .19, S.E. = .08; girls: β = .23, S.E. = .11; *ps* < .05). That is, as peer victimization experiences increased when children were 10, self-report ratings of internalizing problems increased at age 15. Additionally, maternal reported inhibitory control at age 4 was significantly and negatively predictive of peer victimization at 10 (boys: β = -.24 S.E. = .10; girls: β = -.25, S.E. = .09, *ps* < .05). This indicates that as maternal report of children's inhibitory control decreased at age 4, children received more peer victimization nominations at age 10. All other paths in this model were not significant. See Figure 8 for an illustration of this model with standardized parameter estimates.

Moderating Effects. In order to test the hypothesis that the association between peer victimization and internalizing symptoms is moderated by sex, a Wald Chi Square difference test was conducted. Contrary to expectations, the non-significant Chi Square difference test ($\Delta\chi^2$ [1] = 0.87, p = ns), suggests that the coefficient for this path does not differ significantly for males and females. Although the standardized parameter estimate of the association between peer victimization at 10 and internalizing symptoms at 15 is larger in girls (.23) compared to boys (.19), this difference is not statistically significant. There was also no significant interaction between social fear and inhibitory control at 4

predicting peer victimization at age 10. Thus, peer victimized girls were not placed at more risk for adolescent internalizing problems compared to boys.

Indirect Effects. In order to test the hypothesis that social fear has a conditional indirect effect on adolescent internalizing symptoms through peer victimization, indirect effects were examined in the fully constrained model. Unstandardized parameter estimates of the indirect effects and 95% bias-corrected bootstrap confidence intervals are listed in Table 6. Confidence intervals that do not contain the value of 0 indicate significant indirect effects. Similar to the overcontrolled model, inhibitory control was negatively related indirectly to internalizing symptoms at 15 through peer victimization at age 10 (B = -.53; 95% CI: [-1.58– -0.04]). This suggests that lower maternal ratings of children's inhibitory control at 4 were associated with higher internalizing symptoms in adolescence, through the increased risk for peer victimization at age 10. Contrary to the study's hypotheses, there was no conditional indirect effect of social fear in the context of low inhibitory control. That is, children rated as having a combination of low social fear and low inhibitory control at age 4 were not at greater risk for adolescent internalizing problems through increased risk for peer victimization.

Statistical Power. A Monte Carlo simulation was run to examine the proportion of samples in which the observed estimate values were found to be significant. Using the parameter estimate values obtained in the current study (described above for the overcontrolled and undercontrolled models) as the population values and 1000 simulated replications, the models had power to detect significant coefficients in over 93% of the

replicants. This rate is well above the 80% standard convention for desired statistical power. This suggests that the models are amply powered to detect even small effects.

Follow Up Analyses

Controlling for Externalizing Problems. Notably, internalizing symptoms often co-occur with externalizing symptoms (e.g., aggression, hyperactivity, impulsive behavior) with correlations between adolescent internalizing and externalizing symptoms ranging from .25 to .74 (Bornstein, Hahn, & Haynes, 2010; Cole & Carpentieri, 1990). Given that externalizing problems are often characterized by deficits in inhibitory control contributing to dysregulated and impulsive behavior, it could be argued that the significant relations between inhibitory control and social problems (and the indirect association with internalizing symptoms) may be better explained by co-occurring externalizing problems. Thus, in order to examine whether these variables predict internalizing symptoms specifically as opposed to internalizing symptoms co-occurring with externalizing symptoms, the overcontrolled and undercontrolled models were also run with externalizing symptoms at 15 as a covariate for internalizing symptoms at 15. Externalizing symptoms were assessed using mother report on the Externalizing Problems composite T-Score on the BASC-2 when adolescents were 15 years old. The Externalizing Problems Composite is composed of 32 items that assess behaviors such as aggression, conduct issues, and hyperactivity. Sample items include, “loses temper too easily,” “acts out of control,” and “breaks the rules.” See Appendix F for the full list of items. Mothers rated the frequency of adolescent’s behavior on a three-point scale. A response of “0” indicates “Never,” a response of “1” indicates “Sometimes,” and a

response of "2" indicates "Almost Always." Combined sex T-Scores were used with a higher scoring indicating more externalizing behavior.

When the baseline overcontrolled model was run as a multiple group analysis with the addition of 15 year externalizing symptoms covaried out of 15 year internalizing symptoms, the model had acceptable fit (χ^2 [16] = 20.93, p = .18; RMSEA = .04; CFI = .90; SRMR = .05). Externalizing symptoms at age 15 significantly and positively predicted concurrent internalizing symptoms (boys: β = .18, S.E. = .07; girls: β = .24, S.E. = .08; *ps* < .01). This indicates that as self-report ratings of internalizing symptoms at 15 increased, so did ratings of maternal reported externalizing symptoms at the same age. The same pattern of significant and non-significant paths in the original overcontrolled model emerged for direct, moderating, and indirect effects. See Figure 9 for an illustration of this model with standardized parameter estimates for direct effects. Table 7 lists the unstandardized parameter estimates for the indirect effects for boys and girls and 95% bias-corrected confidence intervals. Even when controlling for 15 year externalizing symptoms out of 15 year internalizing symptoms, inhibitory control was negatively related indirectly to internalizing symptoms at 15 through social withdrawal at age 10 (B = -.42; 95% CI: [-1.58– -0.08]). That is, when externalizing symptoms at age 15 were held constant, lower levels of inhibitory control at 4 continues to predict more adolescent internalizing symptoms through increased social withdrawal symptoms at age 10. This indicates that the results are robust even when accounting for externalizing problems that co-occur with 15 year internalizing problems.

When the undercontrolled model was run as a fully constrained multiple group analysis while controlling for 15 year externalizing symptoms out of concurrent internalizing symptoms, the model had excellent fit (χ^2 [15] = 14.21, p = .51; RMSEA = .00; CFI = 1.00; SRMR = .06). Externalizing symptoms at age 15 significantly and positively predicted concurrent internalizing symptoms (boys: β = .20, S.E. = .07; girls: β = .27, S.E. = .07; *ps* < .01). Consistent with the overcontrolled model, as self-report ratings of internalizing symptoms at 15 increased, so did ratings of maternal reported externalizing symptoms at the same age. With the addition of externalizing symptoms at 15 in the model, the association between peer victimization at 10 and internalizing symptoms at 15 becomes only marginally significant (boys: β = .16, S.E. = .09, p =.06; girls: β = .18, S.E. = .10, p =.08). This suggests that when externalizing symptoms are held constant at 15 year, nominations of peer victimization at 10 no longer predict adolescent internalizing problems. However, the indirect effect of inhibitory control on internalizing symptoms at age 15 through peer victimization at age 10 remains significant (B = -.42; 95% CI: [-1.29– -0.01]; see table 8 for unstandardized parameter estimates and 95% bias-corrected confidence intervals). All other paths remain the same as the original fully constrained undercontrolled model. See Figure 10 for an illustration of this model with standardized parameter estimates for direct effects.

Peer Exclusion. In order to further explore the three-way interaction between social fear, inhibitory control, and sex which was contrary to stated hypotheses, an exploratory analysis was conducted. In the current study, it is possible that the assessment of social withdrawal captured not only children's active avoidance of social interaction

but also peer exclusion. With this in mind, children who demonstrate low social fear and low inhibitory control may demonstrate more annoying and irritating behavior, causing them to be avoided by others or excluded from the peer group. Thus, an exploratory analysis was conducted to examine whether an alternate peer problem (as opposed to peer victimization or social withdrawal), namely, peer exclusion, was predicted by a similar combination of low social fear and low inhibitory control. Using the same sociometric peer nomination procedure described above for peer victimization, participants' classmates were asked, question "Who gets left out by other kids?" Participants' total nominations were then standardized within class. Teacher reported social withdrawal was highly correlated with sociometrically rated peer exclusion (r = .47).

When the overcontrolled, "exclusion" model was run as a fully constrained multiple group analysis, the model fit less well. However, the model had adequate fit (χ^2 [11] = 13.87, p = .24; RMSEA = .04; CFI = .82; SRMR = .07). Sociometric peer exclusion at 10 was significantly and positively predictive of self-reported internalizing symptoms at age 15 (boys: β = .21, S.E. = .09; girls: β = .22, S.E. = .10; *ps* < .05). This suggests that as nominations of peer exclusion increased when children were 10, self-report ratings of internalizing symptoms increased at age 15. Maternal reported inhibitory control at age 4 was significantly and negatively predictive of peer exclusion at 10 (boys: β = -.22, S.E. = .09; girls: β =- .25, S.E. = .09; *ps* < .01). This indicates that as maternal report of children's inhibitory control decreased at age 4, children received more peer exclusion nominations at age 10. All other paths in this model were not significant including the interaction between social fear and inhibitory control to predict social

withdrawal (boys: β = .07, S.E. = .09, p = .42; girls: β = .08, S.E. = .10; p = .41). Thus, contrary to the post-hoc hypothesis, there was no significant interaction between social fear and inhibitory control at age 4 predicting peer exclusion at age 10. That is, children with a combination of low social fear and low inhibitory control at age 4 were not at increased risk for sociometrically rated peer exclusion at age 10. See Figure 11 for an illustration of this model and parameter estimates.

CHAPTER IV

DISCUSSION

Given the long-term cost and negative consequences of anxiety and depression in adolescence, more work is needed to understand the processes through which youth develop internalizing problems. Social fear, social withdrawal, and peer victimization are well-established predictors of internalizing problems (Caspi et al., 1996; Ladd, 2006; Reijentes et al., 2010). Additionally, some research has suggested that depending on the context, both higher than average and lower than average inhibitory control is a potential risk factor for negative social experiences. However, no studies have examined all of these factors together within the same long-term longitudinal framework. Guided by theories of socioemotional development, the study examined two process models designed to test the longitudinal relations between young children's temperament, peer processes in preadolescence, and adolescent internalizing symptoms. The current study also examined whether pathways varied differently for boys and girls.

Preliminary Analyses

Preliminary analyses indicated significant associations between demographic variables (sex, SES) and study variables. Thus, the contribution of demographic variables will be discussed first. Regarding sex, girls were rated by mothers as having significantly higher inhibitory control at age 4 compared to boys. This is consistent with the literature suggesting that preschool-aged girls tend to have higher levels of inhibitory control than

boys (Kochanska et al., 2000). Additionally, a small negative association was found for boys between SES and teacher reported social withdrawal at age 10. This suggests that boys from families reporting lower SES at age 4 were rated by teachers as being more socially withdrawn at age 10. This is consistent with previous research suggesting that preschool and preadolescent children demonstrating more socially withdrawn behavior have mothers reporting lower SES (Mills & Rubin, 1993; Schneider, Richard, Younger, & Freeman, 2000). One hypothesis posited by Schneider et al. (2000) is that families with more resources are able to initiate more extracurricular social experiences and peer interactions for their children which in turn increases children's social competence and decreases their risk for social withdrawal. However, in their path analysis testing this hypothesis, there was no significant association between parental initiation of peer activities for children and children's social withdrawal at school. Another possibility is that SES is capturing some other adverse childhood or familial experience that increases risk for social withdrawal, especially for boys. Additional research is needed to better elucidate whether lower socioeconomic status is a proxy measure that captures some other risk factor for social withdrawal.

In examining correlational analyses separately by sex, some expected and unexpected associations emerged. For males, inhibitory control and social fear at 4 were significantly positively associated indicating that boys rated as having higher social fear at 4 were also rated higher in inhibitory control. This is consistent with prior research indicating that social fear and inhibitory control are associated (Aksan & Kochanska, 2004). Additionally, social withdrawal at 10 was significantly and positively associated

with peer victimization at 10 and internalizing symptoms at 15, indicating that more social withdrawal at age 10 is associated with more concurrent peer victimization and more internalizing symptoms at age 15. There were no other significant correlations for males. In contrast, there was no significant correlation between social fear and inhibitory control for females. As with males, social withdrawal at 10 was positively associated with concurrent peer victimization and internalizing symptoms at 15; however additional significant correlations were noted. That is, inhibitory control was significantly and negatively associated with peer victimization at 10 and internalizing symptoms at age 15. Additionally, inhibitory control was significantly and negatively associated with teacher-reported social withdrawal at 10 for females. This indicates that for girls, lower inhibitory control at 4 is associated with more peer victimization and social withdrawal at age 10 as well as more internalizing problems at age 15. Peer victimization at 10 was also significantly and positively associated with internalizing symptoms at 15 for females. This suggests that for girls, more peer victimization at 10 is associated with more internalizing problems at age 15. Overall, these correlational patterns suggest that while social withdrawal is a risk factor for later internalizing problems for boys and girls, some factors may have greater socioemotional consequences for girls as opposed to boys. More specifically, lower inhibitory control appears to increase risk for social withdrawal, peer victimization, and internalizing problems in girls more than it does for boys.

Main Analyses: Overcontrolled Pathway

The results of the current study demonstrated partial support for hypotheses included in Aim 1 as well as some null findings. As hypothesized, social withdrawal at

age 10 predicted internalizing symptoms at age 15. This is consistent with substantial literature suggesting that more social withdrawal increases risk for later internalizing problems (Coplan & Armer, 2007; Katz et al., 2011; Rubin et al., 1989). These results provide further evidence that social withdrawal in preadolescence increases risk for anxiety and depression in adolescence. Surprisingly, there were no associations between children's social fear at age 4 and age 10 social withdrawal or age 15 internalizing problems. There was also a negative association between inhibitory control at age 4 and social withdrawal at 10. This indicates that having less ability to suppress and plan behaviors at age 4 increases risk for social withdrawal at age 10. Moreover, these direct effects of inhibitory control at 4 predicting social withdrawal at 10 and social withdrawal at 10 predicting greater internalizing symptoms at 15 were robust and remained statistically significant when controlling for concurrent externalizing symptoms at 15.

A possible explanation for null findings related to social fear and later outcomes may be in part due to measurement. Social fear was assessed via maternal report on the CBQ as opposed to an observationally coded behavioral task. The majority of studies linking behavioral inhibition (including social fear) and internalizing symptoms have used behavioral observation of inhibited behavior as opposed to questionnaire report (Biederman et al., 2001; Caspi et al., 1996; Rankin Williams et al., 2009; Schwartz, Snidman, & Kagan, 1999). It is possible that behaviorally coded social fear may be a stronger predictor of social withdrawal and internalizing problems compared to maternal report. Additionally, research suggests that the relationship between early BI (including social fear) and later internalizing outcomes becomes weaker over longer spans of time

(Rapee, 2014). Stability or chronicity in social fear over time would likely be a stronger predicter of later social withdrawal and internalizing outcomes, as opposed to a single measurement at one early timepoint. For example, in a longitudinal study completed by Prior and colleagues spanning from infancy to age 14, for children rated as shy or socially fearful at either two or three timepoints (out of 8 total), only 26% showed later internalizing problems at age 14. In contrast, for children rated as socially fearful at 6 or more timepoints about 41% developed internalizing problems at 14 (Prior et al., 2000). It is possible that if multiple assessments of social fear were collected from age 2 to 4, a score indicating more stable social fear would be associated with later social withdrawal and internalizing symptoms in the current study.

Related to this suggestion of using behavioral and cumulative measurements of social fear, is the broader question of how to conceptualize and assess temperamental differences in a developmentally appropriate manner. In fact, some could argue that based on the timing and maternal report method of assessment in the current study, children's scores of social fear and inhibitory control in this project do not reflect their temperamental differences alone. Children's scores could also reflect their family's culture and children's past experiences that have shaped their behavior. For instance, children's socialization experiences as well as parental beliefs may influence how they are rated on these measures. As an example, an initially non-inhibited child could demonstrate socially fearful behavior such as clinging to a parent and not approaching unfamiliar peers after experiencing a significant trauma as a toddler. Children may also demonstrate more inhibited behavior through social modeling from watching other

socially withdrawn adults and children interact with the world. By age 4, children have likely had many experiences with adults and other children that have shaped the way they respond to their environment.

As another example of non-biological or external factors that could influence parental report scores, a parent that does not have much exposure to how other children respond to instructions, play games, and control their behavior may rate their preschooler higher or lower in inhibitory control compared to a parent that has observed many children. To further complicate the picture, aspects of children's temperament interact with their environmental experiences including socialization and family culture to produce behavior. For instance, a child who demonstrates initially inhibited temperament may demonstrate less behavioral inhibition over time after consistently attending a high-quality daycare (Almas et al., 2011), indicating that environmental experiences can shape temperamental behaviors and that there is some instability in trajectories from early individual differences. All of these factors make it nearly impossible to assert that assessments of temperament are "pure," especially as children become older and gain more life experience by the time of assessment.

Studies employing a more conservative approach to assessing temperament independent from social and cultural influences may attempt to "catch" children before environment has significantly impacted their behavior by assessing children's temperament even earlier in development. In fact, one strength of the current study is its relatively earlier assessment of temperament at age 4 (as opposed to assessment in middle childhood or adolescence). But this approach does not completely eliminate

environmental influence. Ultimately, researchers must acknowledge that some aspects of experience and constitutionally based individual differences are intertwined and virtually impossible to isolate one from the other (Shiner & DeYoung, 2013). For instance, although much of temperament is considered to be heritable and biologically based, even before infants are born, their genetic expression (and in turn temperament) is influenced by experiences of the mother during pregnancy (Feldman, 2008; Huizink, 2012). Thus, even when attempting to assess individual differences in temperament earlier in development researchers will continue to capture environmental influences.

It is most likely that the parent report measures of social fear and inhibitory control in the current study capture some aspect of the child's temperament as well as socially learned behavior and other cultural factors. However, rather than attempting to isolate temperament by assessing it even earlier on in the lifespan, it may be more informative for future studies to acknowledge this developmental complexity in their conceptualization of temperament. Moreover, the completion of multiple behavioral and reporter ratings of temperament at multiple timepoints in early childhood will help to determine whether children's reactivity and regulatory patterns are relatively stable across time and situation, a key component of the definition of temperament (Rothbart & Bates, 2006). Thus, multiple assessments of both social fear and inhibitory control at different points in time in early childhood would likely provide a better measure of temperament and allow for examination of whether temperamental stability or instability across time has similar relations with longitudinal socioemotional outcomes.

In contrast with the null associations of social fear at age 4 with later outcomes, a multiple group analysis by gender reveals a significant three-way interaction between social fear, inhibitory control, and sex predicting social withdrawal at age 10. Analysis of the simple slopes suggests that for girls who are low in inhibitory control, as social fear decreases at age 4, risk for social withdrawal at age 10 increases. This is contrary to the theory behind the "overcontrolled" pathway, which by nature suggests that rigid, inhibited, and fearful behavior increases risk for social withdrawal. This result suggests that for girls who do not fear social situations (low social fear) and show more "out of control" behavior and/or less planned behavior (low inhibitory control) at age 4, they are at greater risk for social withdrawal at age 10.

There are several potential explanations for these unexpected findings. One explanation for this result relates to the measurement of social withdrawal in the current study. It is possible that the teacher report of social withdrawal captures not only children's purposeful withdrawal from social situations but also peer exclusion. Examination of items on the teacher reported Withdrawal scale on the BASC-2 includes responses such as, "Has trouble making new friends" and "Is chosen last by other children for games" which are more indicative of social competence and social exclusion as opposed to children's social withdrawal. Consistent with the theory behind the "undercontrolled" model, for children who display more impulsive, immature, socially intrusive behavior, peer problems such as peer rejection and victimization are more likely. Thus, if the measure of social withdrawal is capturing more peer exclusion, this result supports theory. Moreover, this interaction effect may be significant for girls and

not boys due to socially intrusive, less socially skilled, aggressive, and disinhibited behavior being less tolerated by peers in females as opposed to males. For example, a girl who demonstrates low social fear and low inhibitory control may have difficulty waiting her turn in games, may push other children out of the way to get something she wants, and/or have difficulty appropriately joining others' play (e.g., does not ask permission to use a classmate's belongings, does not greet others). As girls tend to have higher inhibitory control in preschool compared to boys (Else-Quest et al., 2006), these behaviors are more uncommon and unexpected in girls. Thus, when this girl is on the playground or sitting in class, other children may go out of their way to avoid her and exclude her from activities.

According to the gender appropriateness hypothesis (Kerr, Lambert, Stattin, & Klackenberg-Larsson, 1994), culturally based stereotypes of male and female behavior set rules for how girls and boys "should" behave. When children's behavior differs from these expectations, their behavior is considered more deviant and is less tolerated by adults and the peer group (e.g., results in peer rejection/peer exclusion). In many cultures a stereotype is held that females are expected to be well-behaved and quiet. Thus, when children are loud, dysregulated, and intrusive this unexpected behavior has harsher social consequences for girls compared to boys. Illustrating this theory, empirical work studying the impact of aggression on social outcomes indicates that girls who demonstrate aggression are more rejected by peers than boys who engage in the same amount of aggression (Crick, 1997; Keenan, Loeber, & Green, 1999). Likewise, other work suggests that boys with Attention-Deficit/Hyperactivity (a condition characterized by deficits in

inhibitory control), are tolerated more by peers than girls with the same severity of ADHD symptoms (Diamantopoulou, Henricsson, & Rydell, 2005). These data indicate that for girls, the demonstration of more aggressive and disinhibited behavior may have more negative social consequences in the form of social exclusion compared to boys. Thus, if the measurement of social withdrawal includes items related to peer exclusion this three-way interaction makes theoretical sense.

In order to test this hypothesis that the assessment of social withdrawal used in the current study is capturing peer exclusion at age 10, an exploratory, follow up analysis was run with sociometrically assessed peer exclusion at age 10. It was hypothesized that for girls low in inhibitory control, as social fear decreases, risk for sociometrically rated peer exclusion at age 10 would increase. However, there was no significant interaction between social fear and inhibitory control at age 4 predicting peer exclusion at age 10 for girls or boys. With this nonsignificant finding, it remains unclear whether the measurement of social withdrawal is capturing purely active social withdrawal or a combination of withdrawal and peer exclusion. In order to better address this measurement question, it would be important in future studies to clearly differentiate between active social withdrawal and peer exclusion in their measurement by assessing children's motivations. Coplan and colleagues (Coplan, Ooi, Xiao, & Rose-Krasnor, 2018) highlight the importance of assessing children's motivational tendencies in addition to their observed behavioral social withdrawal in order to accurately differentiate between shy-anxious social withdrawal, unsociability (i.e., children's desire to be alone), and social exclusion by the peer group. In addition to behavioral coding of solitary

behavior with measures such as Rubin's Play Observation Scale (1989), children's motivations can be assessed with measures such as the Child Social Preference Scale (CSPS, Coplan et al., 2004) and self-report Preference for Solitary Play Interview (Coplan, Ooi, Rose-Krasnor, & Nocita, 2014). The CSPS is a parent report questionnaire used to distinguish the motivations behind solitary behavior with sample items such as, "my child seems to want to play with others, but is sometimes nervous to." Future studies examining the longitudinal associations of temperament with social withdrawal and later internalizing symptoms should make considerations for subtypes of social withdrawal and assess these constructs via behavioral observation as well as suspected motivations.

Another possibility for this unexpected interaction between social fear and inhibitory control predicting social withdrawal for girls is due to developmental timing. That is, prior research documenting that children high in both BI and inhibitory control experience more social withdrawal has been restricted to concurrent assessment when children were in preschool (Fox & Henderson, 2000) or longitudinal studies from age 3 to age 6 (Eggum-Wilkens et al., 2015). Notably, the current study assesses social fear and inhibitory control at age 4 and social withdrawal at age 10. It is possible that due to changes in developmental demands across this longer timeframe, this combination of risk factors including high social fear and high inhibitory control predicting more social withdrawal becomes weaker. Moreover, having higher inhibitory control may become more protective against social withdrawal and internalizing problems as children age. For instance, as children progress through school, academics become increasingly more difficult and peer relationships become more important. Higher rates of inhibitory control

have been linked to both higher academic achievement (McClelland & Cameron, 2011) and higher social skills (Rhoades, Greenberg, & Domitrovich, 2009). It makes sense that children who are better able to control their behavior and direct their actions towards goals are able to engage in activities that result in better grades (e.g., studying, completing homework) at school and more social competence (e.g., sharing, politeness). Higher achievement in both of these areas have been linked with decreased risk for social withdrawal (Hughes & Coplan, 2010; Rubin, Root, & Bowker, 2010) and fewer internalizing symptoms (Burt, Obradović, Long, & Masten, 2008; Masten et al., 2005). Thus, across this span of development it may be more maladaptive to have lower rates of inhibitory control in combination with lower social fear due to the need for more regulatory skill to succeed in multiple domains. Moreover, children's success and the feedback they receive from their environment impacts how children view themselves and the world around them.

Additionally, this model does not capture earlier social experiences that occurred between age 4 and age 10 that may explain the link between temperament and social withdrawal in preadolescence. That is, preschool-aged girls demonstrating average to low fear of social situations and more impulsive, aggressive, less skilled behavior are at greater risk for peer victimization and peer exclusion/peer rejection by other children. Peer victimization and peer rejection have concurrent and longitudinal associations with social withdrawal (Ladd, Ettekal, & Kochenderfer-Ladd, 2019). When children are picked on or avoided by peers, they often will avoid social contexts over time. Thus, it is possible that this finding is better explained by a different social variable (e.g., peer

victimization, peer exclusion) occurring earlier in development before age 10. For instance, a girl who demonstrates immature, aggressive, and less controlled behavior when she is 4 may get bullied or excluded by peers at ages 5, 6, 7, and etc. Her negative peer experiences then lead her to withdraw from social situations as she ages. Thus, she demonstrates more social withdrawal at age 10. Questions such as these may be better addressed through a developmental cross-lag path model in which individual and social variables are all assessed at multiple sequential timepoints (e.g., 2, 4, 7, 10, 15) and the stability and crosslag models can be compared. As noted above, stability and instability of temperament across time would be important to examine in relation to the other socioemotional outcomes of the study. Additionally, stability of children's internalizing symptoms, social withdrawal, and peer victimization could be examining across time as well as potential mechanisms through which patterns change (e.g., peer victimization at age 7 increases risk for social withdrawal at 10 which increases risk for internalizing problems at 15).

Although the current study hypothesized that males who experience social withdrawal at 10 would be at even greater risk for internalizing symptoms at 15 compared to females, results do not suggest that the path from social withdrawal at 10 to internalizing symptoms at 15 varies by sex. This is inconsistent with literature suggesting that social withdrawal may be more harmful for boys' socioemotional development due to societal norms and expectations (Coplan & Weeks, 2010; Doey, Coplan, & Kingsbury, 2014; Eisenberg, Shepard, Fabes, Murphy, & Guthrie, 1998). However, others have argued that reported gender effect on the impact of social withdrawal on children's

psychosocial adjustment are mixed with some studies not finding significant differences between boys and girls (Rubin et al., 2009). Rubin and Barstead (2014) present data from their longitudinal study, The Friendship Project, suggesting that self-reported social withdrawal and self-reported symptoms of anxiety and depression in 8th and 9th graders had a significant positive relationship for both boys and girls. Moreover, the magnitude of the association did not differ for boys and girls. Rubin and Barstead argue that these mixed findings of some studies identifying gender differences are due in part to researchers using a variety of measurement tools to assess social withdrawal (self-report, parent report, behavioral observation) which do not necessarily map on to the same construct (e.g., using a subscale on the Revised Class Play that includes withdrawal from the peer group with isolation by the peer group). The authors do not entirely discount the possibility that boys who experience social withdrawal are at greater risk for internalizing symptoms. However, as noted above, it is difficult to make empirical conclusions about what behaviors or constructs are associated with social withdrawal when indicators of both active social withdrawal and social exclusion are assessed in the same scale.

Finally, there was also a significant negative effect of inhibitory control at 4 on adolescent internalizing symptoms 11 years later, through social withdrawal at age 10. This suggests that very early on children who demonstrate deficits in inhibitory control are placed at increased risk for internalizing symptoms through increased risk for social withdrawal. Although the literature linking inhibitory control and internalizing symptoms has been inconsistent, this supports some studies finding a negative relationship (Bufferd et al., 2014; Eisenberg et al., 2004). It is likely that children who are less regulated and

less able to control their impulses are placed at risk for a host of negative outcomes including negative peer experiences. Moreover, if the current study's assessment of social withdrawal is capturing peer exclusion as opposed to children's active withdrawal from the peer group, this further demonstrates the importance of inhibitory control in reducing risk for peer adversity. Having lower ability to control one's behavior may make children more annoying and aversive to peers. Children with lower inhibitory control may also be less skilled at sports, games, and sharing, which makes kids less desirable as playmates. If children are considered less "fun" playmates, they are less likely to receive invitations to play and more likely to be excluded by peers from various activities, which in turn increases children's feelings of loneliness and other internalizing symptoms. These findings highlight how inhibitory control is not only adaptive in reducing risk for externalizing problems such as aggression and increasing academic success, but also important in protecting children from internalizing problems through its impact on social processes.

Main Analyses: Undercontrolled Pathway

Results from the current study demonstrated partial support for hypotheses included in Aim 2. As hypothesized, social fear at age 4 was not significantly associated with peer victimization. Additionally, as hypothesized, peer victimization had a significant positive association with internalizing symptoms at age 15. This is consistent with pre-existing literature suggesting that peer victimization in childhood increases risk for later internalizing problems (Ladd, Ettekal, & Kochenderfer-Ladd, 2019; Reijntjes et al., 2010). Moreover, this finding extends results from the majority of other longitudinal

studies in which the time span from peer victimization to internalizing outcomes lasts 2 years or less (Reijntjes et al., 2010). These data suggest that peer victimization assessed once at age 10 is associated with more internalizing problems even 5 years later.

Contrary to the study's hypothesis, children with low social fear and low inhibitory control at 4 were not at increased risk for peer victimization at 10. Additionally, although it was hypothesized that females who experienced peer victimization would be at even greater risk for internalizing symptoms, this was not found. This is inconsistent with literature suggesting that females are more sensitive to social stress and thus are more negatively impacted by the stressor of peer victimization, leading to further internalizing symptoms (Sentse, Prinzie, & Salmivalli, 2017; Thompson & Leadbeater, 2012). In another long-term longitudinal study, Schwartz and colleagues (2015) did not find a significant moderation of the association between peer victimization and later internalizing symptoms by sex. They argue that one possibility for their null moderating effect is that they did not assess specifically for subtypes of aggression including physical and relational aggression. It is possible that girls may have a more negative reaction to one form of peer victimization over the other. Thus, in future studies it would be helpful to assess different subtypes of peer victimization to determine moderation by gender effects.

Finally, contrary to hypotheses, children low in social fear and low in inhibitory control at 4 were not at increased risk for adolescent internalizing problems through increased risk for peer victimization at age 10. However, consistent with results in the overcontrolled model, inhibitory control negatively impacted internalizing outcomes at

15 through peer victimization at age 10. This is consistent with literature suggesting that dysregulated behavior in early childhood increases risk for peer victimization in middle childhood and in turn increases risk for depression in middle school (Bierman et al., 2015). Researchers suggest that lower regulation upon entry into preschool leads children to have poorly controlled emotional reactions such as tantrums and whining as well as out of proportion responses to peer provocation. These children are argumentative, impulsive, and volatile. They are viewed as annoying by other children. They are also less socially skilled and competent compared to other youth. As such, this increases children's risk to be picked on by peers. Peer victimization in turn increases risk for later internalizing symptoms. Follow up analyses also suggest that the association between inhibitory control's indirect effect on internalizing symptoms remains significant after controlling for 15 year externalizing symptoms, indicating that this result is not only due to adolescents' comorbid externalizing symptoms.

Summary, Limitations, and Future Directions

This study brought together extensive literatures examining temperament, social withdrawal, and peer victimization to investigate how these variables operate together across development to increase risk for adolescent internalizing symptoms. Substantial research has indicated that temperament and social factors such as peer victimization and social withdrawal have concurrent and longitudinal relations with adolescent anxiety and depression. However, no studies have examined how both reactive and regulatory aspects of temperament work together with social experiences (social withdrawal, peer victimization) to increase risk for internalizing symptoms in adolescence. Moreover, few

if any studies have examined how reactive and regulatory temperament's impact on socioemotional outcomes differs for boys and girls. The current study fills these gaps using a prospective longitudinal design as well as separate reporters at each time point, eliminating same-reporter bias and method specific effects.

Consistent with previous literature, results indicate that having more social withdrawal and peer victimization in preadolescence increases risk for youth's symptoms of anxiety and depression 5 years later. Additionally, results from this study highlight the impact of early temperament on adolescent internalizing symptoms. That is, children's deficits in inhibitory control in preschool negatively predicted children's social withdrawal and peer victimization in preadolescence which in turn increased risk for internalizing symptoms in adolescence. Moreover, a significant interaction for girls indicated that a combination of low social fear and low inhibitory control in preschool placed girls at even more risk for social withdrawal in preadolescence. This is consistent with correlational analyses with girls (but not for boys) indicating that lower inhibitory control at 4 is associated with more social withdrawal and peer victimization at 10 as well as more internalizing symptoms at 15. Follow up analyses with concurrent externalizing symptoms at age 15 indicate the robustness of all associations between model variables (with the exception of 10 year peer victimization's direct effect on 15 year internalizing symptoms).

These results suggest that deficits in inhibitory control have long lasting negative emotional effects on children. That is, children who demonstrate less skilled and planned behavior across situations may have difficulty successfully joining peers as well as being

less skilled at sports and games. They also demonstrate annoying and aggressive behavior. All of these behaviors increase children's risk for social adversity including peer victimization and social withdrawal which increase children's likelihood of developing anxiety and depression. Importantly, the demonstration of these behaviors associated with lower inhibitory control has more drastic social consequences for females as opposed to males due to social rules about how females "should" behave. In terms of practical and clinical applications that emerge from this study, improving individuals' regulatory abilities (especially for preschool girls low in inhibitory control) in early childhood may be a critical first step to facilitate more successful social interactions in preadolescence and decrease risk for anxiety and depression in adolescence. For instance, interventions designed to improve children's self-regulation in kindergarten and first grade may be especially helpful to bolster skills in girls who have difficulty regulating and enacting appropriate behavior. In particular, computerized executive function training, mindfulness training, and supplementary classroom instruction have all been shown to demonstrate increases in children's self-control for kids as young as 5 (Diamond & Lee, 2011). Improving children's inhibitory control may support more effective social skills, classroom behavior, and cooperative strategies that facilitate more successful peer interactions, which in turn reduce resulting feelings of anxiety, loneliness, and sadness.

Despite the strengths of this study, the current study is not without limitations. For instance, as pointed out by Rubin and Barstead (2014) as well as Coplan and colleagues (2018), measurement of social withdrawal should distinguish between children's

intentional withdrawal from social situations as opposed to exclusion from the peer group. As noted above, it is possible that the current study's assessment of social withdrawal also captured children's tendency to be excluded by others. However, a follow up analysis with sociometric peer exclusion at age 10 did not produce results comparable to the analysis with social withdrawal. These inconclusive findings highlight the importance of methodological precision when assessing social withdrawal to differentiate different types of solitary behavior.

This distinction between subtypes of solitary behavior is not only important in order to clarify associations between temperament and social withdrawal, but also to appropriately inform clinical interventions. For instance, therapeutic interventions designed to help reduce risk for depression and anxiety would vastly differ depending on the type of solitary behavior a child displays. For instance, imagine a preschooler who is socially fearful and is hesitant to approach others and a preschooler who is less able to control/plan his behavior and excluded by peers. The socially fearful child may be very sensitive to the social environment and constantly watching for negative cues. She may have worries that she will embarrass herself or that the new and unfamiliar peers will be mean to her. Children with this motivation for withdrawal may benefit from a more cognitive behavioral approach to combat their negative expectations and decrease their hypervigilance in social situations. In contrast, a child who is solitary because he is excluded by peers demonstrates immature and less skilled behavior. He may have little awareness that other children find him annoying and do not want to play with him. This child may benefit from increasing his self-regulation skills. He may also gain from a

social skills training approach and parental reinforcement of positive behaviors. With these examples in mind, differentiating between types of solitary behavior is clearly important for how research is applied. Future studies should employ both observational assessment of withdrawal behavior as well as social motivational tendency measures to disentangle these distinct social processes that can result in solitary behavior to better inform our understanding of social withdrawal as well as how to intervene to reduce risk for negative outcomes such as internalizing problems.

This study also focused on how temperament may impact later internalizing problems through *negative* social processes. However, it also possible that different temperamental profiles may help children develop positive social features such as higher quality friendships and peer acceptance, which in turn may decrease risk for internalizing problems. For instance, children with higher rates of inhibitory control have been found to experience less conflict with peers in preschool (Acar, Rudasill, Molfese, Torquati, & Prokasky, 2015) and rate increased concurrent peer acceptance in preadolescence (Oberle & Schonert-Reichl, 2013). Future research could extend the current study by testing whether the association between inhibitory control and internalizing symptoms is also mediated by positive peer relationships in preadolescence.

Another limitation of the study concerns the models' reliance on single indicators for each construct. It is possible that some null findings are due to this method. In contrast, a latent variable approach uses multiple measures for the same construct that share little measurement-specific variance (e.g., behavioral task, sociometric peer nomination, parent report). By using statistical techniques in Structural Equation

Modeling a latent variable is created that consists of the common variance across those tasks. Ideally, this variable captures the "pure" construct (e.g., social withdrawal, inhibitory control) without the error introduced by specific task demands (Bollen, 2002). Future studies examining these models should consider creating latent variables for each construct to better assess the behaviors of interest.

It should also be noted that this study was completed with a sample of children originally oversampled for externalizing behaviors at age 2. As a result, this sample is not representative of either a community sample or a clinical population of adolescents with diagnoses of depression and anxiety. This limits the generalizability of findings but also indicates that future studies should test these pathways in both typically developing as well as clinical populations. For example, it would be interesting to examine if a more overcontrolled style of temperament increases risk for adolescent internalizing symptoms with participants that have been oversampled for high social fear in preschool.

Finally, due to difficulties with model fit and the desire to maintain statistical power, the overcontrolled and under controlled models were run separately. However, future studies with substantial sample size should consider running overcontrolled and undercontrolled models in the same analysis. That is, social withdrawal and peer victimization at 10 could be run as parallel mediators of the association between preschool temperament and adolescent internalizing symptoms.

Despite these limitations, the current study provides replication of pre-existing findings suggesting that social withdrawal and peer victimization in preadolescence increase risk for internalizing symptoms at age 15, for both boys and girls. Moreover, the

association between social withdrawal and internalizing symptoms remains significant even when controlling for concurrent externalizing symptoms at age 15. Additionally, the study offers important insight into how early temperament, specifically inhibitory control, has lasting effects on adolescent internalizing symptoms. Children rated as having lower inhibitory control in preschool were more likely to experience peer victimization and social withdrawal at age 10, which in turn increased their risk of experiencing internalizing symptoms in adolescence. Moreover, results indicate that girls who demonstrate deficits in inhibitory control in combination with low social fear, are at even greater risk for social withdrawal. Despite a historical focus on behavioral inhibition (including social fear)'s impact on internalizing symptoms through shy, anxious behavior, these results indicate that inhibitory control in early childhood can have long-lasting effects on children's successful social interactions that are important to consider to prevent later symptoms of anxiety and depression.

REFERENCES

Acar, I. H., Rudasill, K. M., Molfese, V., Torquati, J., & Prokasky, A. (2015). Temperament and preschool children's peer interactions. *Early Education and Development, 26*(4), 479–495. https://doi.org/10.1080/10409289.2015.1000718

Achenbach, T. (1991). *Manual for the Child Behavior Checklist/4 - 18 and 1991 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Achenbach, T. (1992). *Manual for the Child Behavior Checklist/2-3 and 1992 Profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Affrunti, N. W., Geronimi, E. M. C., & Woodruff-Borden, J. (2014). Temperament, peer victimization, and nurturing parenting in child anxiety: A moderated mediation model. *Child Psychiatry and Human Development*, *45*(4), 483–492. https://doi.org/10.1007/s10578-013-0418-2

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications.

Aksan, N., & Kochanska, G. (2004). Links between systems of inhibition from infancy to preschool years. *Child Development*, *75*(5), 1477–1490. https://doi.org/10.1111/j.1467-8624.2004.00752.x

Almas, A. N., Degnan, K. A., Fox, N. A., Phillips, D. A., Henderson, H. A., Moas, O. L., & Hane, A. A. (2011). The relations between infant negative reactivity, non-maternal childcare, and children's interactions with familiar and unfamiliar peers. *Social Development*, *20*(4), 718–740. https://doi.org/10.1111/j.1467-9507.2011.00605.x

Avenevoli, S., Swendsen, J., He, J.-P., Burstein, M., & Merikangas, K. R. (2015). Major depression in the National Comorbidity Survey–Adolescent Supplement: Prevalence, correlates, and treatment. *Journal of the American Academy of Child & Adolescent Psychiatry*, *54*(1), 37–44.e2. https://doi.org/10.1016/j.jaac.2014.10.010

Babcock, B., Marks, P. E. L., Crick, N. R., & Cillessen, A. H. N. (2014). Limited nomination reliability using single- and multiple-item measures. *Social Development*, *23*(3), 518–536. https://doi.org/10.1111/sode.12056

Berger, Kathleen. (2007). Update on bullying at school: Science forgotten? *Developmental Review, 27*, 90-126. https://doi.org/10.1016/j.dr.2006.08.002.

Biederman, J., Hirshfeld-Becker, D. R., Rosenbaum, J. F., Herot, C., Friedman, D., Snidman, N., … Faraone, S. V. (2001). Further evidence of association between behavioral inhibition and social anxiety in children. *The American Journal of Psychiatry*, *158*(10), 1673–1679. https://doi.org/10.1176/appi.ajp.158.10.1673

Bierman, K. L., Kalvin, C. B., & Heinrichs, B. S. (2015). Early childhood precursors and adolescent sequelae of grade school peer rejection and victimization. *Journal of Clinical Child & Adolescent Psychology*, *44*(3), 367–379. https://doi.org/10.1080/15374416.2013.873983

Bollen, K. A. (2002). Latent variables in psychology and the social sciences. *Annual Review of Psychology*, *53*, 605–634. https://doi.org/10.1146/annurev.psych.53.100901.135239

Booth-LaForce, C., & Oxford, M. L. (2008). Trajectories of social withdrawal from grades 1 to 6: Prediction from early parenting, attachment, and temperament. *Developmental Psychology*, *44*(5), 1298–1313. https://doi.org/10.1037/a0012954

Bornstein, M. H., Hahn, C.-S., & Haynes, O. M. (2010). Social competence, externalizing, and internalizing behavioral adjustment from early childhood through early adolescence: Developmental cascades. *Development and Psychopathology*, *22*(4), 717–735. https://doi.org/10.1017/S0954579410000416

Boulton, M. J., Smith, P. K., & Cowie, H. (2010). Short-term longitudinal relationships between children's peer victimization/bullying experiences and self-perceptions: Evidence for reciprocity. *School Psychology International*, *31*(3), 296–311. https://doi.org/10.1177/0143034310362329

Bufferd, S. J., Dougherty, L. R., Olino, T. M., Dyson, M. W., Laptook, R. S., Carlson, G. A., & Klein, D. N. (2014). Predictors of the onset of depression in young children: A multi-method, multi-informant longitudinal study from ages 3 to 6. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *55*(11), 1279–1287. https://doi.org/10.1111/jcpp.12252

Burt, K. B., Obradović, J., Long, J. D., & Masten, A. S. (2008). The interplay of social competence and psychopathology over 20 years: Testing transactional and cascade models. *Child Development*, *79*(2), 359–374. https://doi.org/10.1111/j.1467-8624.2007.01130.x

Calkins, S. D., Dedmon, S. E., Gill, K. L., Lomax, L. E., & Johnson, L. M. (2002). Frustration in infancy: Implications for emotion regulation, physiological processes, and temperament. *Infancy*, *3*(2), 175–197. https://doi.org/10.1207/S15327078IN0302_4

Capaldi, D. M., & Rothbart, M. K. (1992). Development and validation of an Early Adolescent Temperament Measure. *The Journal of Early Adolescence*, *12*(2), 153–173. https://doi.org/10.1177/0272431692012002002

Caspi, A., Moffitt, T. E., Newman, D. L., & Silva, P. A. (1996). Behavioral observations at age 3 years predict adult psychiatric disorders: Longitudinal evidence from a birth cohort. *Archives of General Psychiatry*, *53*(11), 1033–1039. https://doi.org/10.1001/archpsyc.1996.01830110071009

Centers for Disease Control and Prevention (CDC). (2016). Deaths: Leading causes for 2014. *NVSS. National Vital Statistics Reports.* Retrieved from https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_05.pdf

Chen, X., DeSouza, A. T., Chen, H., & Wang, L. (2006). Reticent behavior and experiences in peer interactions in Chinese and Canadian children. *Developmental Psychology*, *42*(4), 656–665. https://doi.org/10.1037/0012-1649.42.4.656

Cicchetti, D., & Rogosch, F. A. (1996). Equifinality and multifinality in developmental psychopathology. *Development and Psychopathology*, *8*, 597–600. https://doi.org/10.1017/S0954579400007318

Cicchetti, D., & Toth, S. L. (2009). The past achievements and future promises of developmental psychopathology: The coming of age of a discipline. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *50*(1-2), 16–25. https://doi.org/10.1111/j.1469-7610.2008.01979.x

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology*, *18*(4), 557–570. https://doi.org/10.1037/0012-1649.18.4.557

Cole, D. A., & Carpentieri, S. (1990). Social status and the comorbidity of child depression and conduct disorder. *Journal of Consulting and Clinical Psychology*, *58*(6), 748–757. https://doi.org/10.1037//0022-006x.58.6.748

Coplan, R. J., & Armer, M. (2007). A "multitude" of solitude: A closer look at social withdrawal and nonsocial play in early childhood. *Child Development Perspectives*, *1*(1), 26–32. https://doi.org/10.1111/j.1750-8606.2007.00006.x

Coplan, R. J., Ooi, L. L., Rose-Krasnor, L., & Nocita, G. (2014). "I want to play alone": Assessment and correlates of self-reported preference for solitary play in young children. *Infant and Child Development*, *23*(3), 229–238. https://doi.org/10.1002/icd.1854

Coplan, R. J., Ooi, L. L., Xiao, B., & Rose-Krasnor, L. (2018). Assessment and implications of social withdrawal in early childhood: A first look at social avoidance. *Social Development*, *27*(1), 125–139. https://doi.org/10.1111/sode.12258

Coplan, R. J., Prakash, K., O'Neil, K., & Armer, M. (2004). Do you "want" to play? Distinguishing between conflicted shyness and social disinterest in early childhood. *Developmental Psychology*, *40*(2), 244–258. https://doi.org/10.1037/0012-1649.40.2.244

Coplan, R. J., & Weeks, M. (2010). Unsociability in middle childhood: Conceptualization, assessment, and associations with socioemotional functioning. *Merrill-Palmer Quarterly*, *56*(2), 105–130. https://doi.org/10.1353/mpq.2010.0005

Costello, E., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, *60*(8), 837–844. https://doi.org/10.1001/archpsyc.60.8.837

Coyne, L. W., & Thompson, A. D. (2011). Maternal depression, locus of control, and emotion regulatory strategy as predictors of preschoolers' internalizing problems. *Journal of Child and Family Studies*, *20*(6), 873–883. https://doi.org/10.1007/s10826-011-9455-2

Crick, N. R. (1997). Engagement in gender normative versus nonnormative forms of aggression: Links to social-psychological adjustment. *Developmental Psychology*, *33*(4), 610–617. https://doi.org/10.1037/0012-1649.33.4.610

Degnan, K. A., Almas, A. N., & Fox, N. A. (2010). Temperament and the environment in the etiology of childhood anxiety. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*(4), 497–517. https://doi.org/10.1111/j.1469-7610.2010.02228.x

Degnan, K. A., & Fox, N. A. (2007). Behavioral inhibition and anxiety disorders: Multiple levels of a resilience process. *Development and Psychopathology*, *19*(3), 729–746. https://doi.org/10.1017/S0954579407000363

Dennis, T. A., Brotman, L. M., Huang, K.-Y., & Gouley, K. K. (2007). Effortful control, social competence, and adjustment problems in children at risk for psychopathology. *Journal of Clinical Child & Adolescent Psychology*, *36*(3), 442–454. https://doi.org/10.1080/15374410701448513

Diamantopoulou, S., Henricsson, L., & Rydell, A.-M. (2005). ADHD symptoms and peer relations of children in a community sample: Examining associated problems, self-perceptions, and gender differences. *International Journal of Behavioral Development*, *29*(5), 388–398. https://doi.org/10.1177/01650250500172756

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4–12 years old. *Science*, *333*(6045), 959–964. https://doi.org/10.1126/science.1204529

Dodge, K. A., Lansford, J. E., Burks, V. S., Bates, J. E., Pettit, G. S., Fontaine, R., & Price, J. M. (2003). Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Development*, *74*(2), 374–393. https://doi.org/10.1111/1467-8624.7402004

Doey, L., Coplan, R. J., & Kingsbury, M. (2014). Bashful boys and coy girls: A review of gender differences in childhood shyness. *Sex Roles*, *70*(7), 255–266. https://doi.org/10.1007/s11199-013-0317-9

Egan, S. K., & Perry, D. G. (1998). Does low self-regard invite victimization? *Developmental Psychology*, *34*(2), 299–309. https://doi.org/10.1037/0012-1649.34.2.299

Eggum, N. D., Eisenberg, N., Spinrad, T. L., Reiser, M., Gaertner, B. M., Sallquist, J., & Smith, C. L. (2009). Development of shyness: Relations with children's fearfulness, sex, and maternal behavior. *Infancy, 14*(3), 325–345. https://doi.org/10.1080/15250000902839971

Eggum-Wilkens, N. D., Reichenberg, R. E., Eisenberg, N., & Spinrad, T. L. (2015). Components of effortful control and their relations to children's shyness. *International Journal of Behavioral Development*, *40*(6), 544–554. https://doi.org/10.1177/0165025415597792

Eisenberg, N., Hofer, C., & Vaughan, J. (2007). Effortful control and its socioemotional consequences. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 287-306). New York, NY, US: The Guilford Press.

Eisenberg, N., Smith, C. L., Sadovsky, A., & Spinrad, T. L. (2004). Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. In R. F. Baumeister & K. D. Vohs (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 259-282). New York, NY, US: The Guilford Press.

Eisenberg, N., Shepard, S. A., Fabes, R. A., Murphy, B. C., & Guthrie, I. K. (1998). Shyness and children's emotionality, regulation, and coping: contemporaneous, longitudinal, and across-context relations. *Child Development*, *69*(3), 767–790. https://doi.org/10.2307/1132203

Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., … Murphy, B. (2004). The relations of effortful control and impulsivity to children's resiliency and adjustment. *Child Development*, *75*(1), 25–46. https://doi.org/10.1111/j.1467-8624.2004.00652.x

Eisenberg, N., Valiente, C., Spinrad, T. L., Liew, J., Zhou, Q., Losoya, S. H., … Cumberland, A. (2009). Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occurring behavior problems. *Developmental Psychology*, *45*(4), 988–1008. https://doi.org/10.1037/a0016213

Else-Quest, N. M., Hyde, J. S., Goldsmith, H. H., & Van Hulle, C. A. (2006). Gender differences in temperament: meta-analysis. *Psychological Bulletin*, *132*(1), 33–72. https://doi.org/10.1037/0033-2909.132.1.33

Feldman, R. (2008). The intrauterine environment, temperament, and development: Including the biological foundations of individual differences in the study of psychopathology and wellness. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*(3), 233-235. https://doi.org/10.1097/CHI.0b013e3181613a92.

Finney, S. J., & DiStefano, C. (2006). Non-normal and categorical data in structural equation modeling. In G. R. Hancock & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 269-314). Greenwich, CT: Information Age Publishing.

Fox, N.A. & Henderson, H. A. (2000, April). *Temperament, emotion, and executive function: Influences on the development of self-regulation.* Paper presented at the Annual Meeting of the Cognitive Neuroscience Society, San Francisco, CA.

Fox, N. A., Henderson, H. A., Marshall, P. J., Nichols, K. E., & Ghera, M. M. (2005). Behavioral inhibition: Linking biology and behavior within a developmental framework. *Annual Review of Psychology*, *56*, 235–262. https://doi.org/10.1146/annurev.psych.55.090902.141532

Fox, N. A., Henderson, H. A., Rubin, K. H., Calkins, S. D., & Schmidt, L. A. (2001). Continuity and discontinuity of behavioral inhibition and exuberance: Psychophysiological and behavioral ifluences across the first four years of life. *Child Development*, *72*(1), 1–21. https://doi.org/10.1111/1467-8624.00262

Fox, N. A., Nichols, K. E., Henderson, H. A., Rubin, K., Schmidt, L., Hamer, D., … Pine, D. S. (2005). Evidence for a gene-environment interaction in predicting behavioral inhibition in middle childhood. *Psychological Science*, *16*(12), 921–926. https://doi.org/10.1111/j.1467-9280.2005.01637.x

Gao, S., Mokhtarian, P. L., & Johnston, R. A. (2008). Nonnormality of data in structural equation models. *Transportation Research Record*, *2082*(1), 116–124. https://doi.org/10.3141/2082-14

Goldbaum, S., Craig, W. M., Pepler, D., & Connolly, J. (2007). Developmental trajectories of victimization: Identifying risk and protective factors. In J. E. Zins, M. J. Elias, & C. A. Maher (Eds.), *Bullying, victimization, and peer harassment: A handbook of prevention and intervention* (pp. 143–160). New York, NY, US: Haworth Press.

Goldsmith, H. H. (1996). Studying temperament via construction of the Toddler Behavior Assessment Questionnaire. *Child Development*, *67*(1), 218–235. https://doi.org/10.2307/1131697

Goldsmith, H., & Rothbart, M. K. (1996). Prelocomotor and locomotor Laboratory Temperament Assessment Battery (Lab-TAB; version 3.0, Technical Manual). *Madison: University of Wisconsin, Department of Psychology*.

Goodman, S. H., Rouse, M. H., Connell, A. M., Broth, M. R., Hall, C. M., & Heyward, D. (2011). Maternal depression and child psychopathology: A meta-analytic review. *Clinical Child and Family Psychology Review*, *14*(1), 1–27. https://doi.org/10.1007/s10567-010-0080-1

Gulley, L. D., Hankin, B. L., & Young, J. F. (2016). Risk for depression and anxiety in youth: The interaction between negative affectivity, effortful control, and stressors. *Journal of Abnormal Child Psychology*, *44*(2), 207–218. https://doi.org/10.1007/s10802-015-9997-7

Hanish, L. D., Eisenberg, N., Fabes, R. A., Spinrad, T. L., Ryan, P., & Schmidt, S. (2004). The expression and regulation of negative emotions: Risk factors for young children's peer victimization. *Development and Psychopathology*, *16*(2), 335–353. https://doi.org/10.1017/S0954579404044542

Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, *41*(4), 441–455. https://doi.org/10.1111/1469-7610.00629

Hayes, A. F. (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach.* New York, NY, US: Guilford Press.

Hodges, E. V., Boivin, M., Vitaro, F., & Bukowski, W. M. (1999). The power of friendship: Protection against an escalating cycle of peer victimization. *Developmental Psychology*, *35*(1), 94–101. https://doi.org/10.1037/0012-1649.35.1.94

Hollingshead, A. (1975). *Four-factor index of social status.* New Haven, CT: Yale.

Hong, J. S., & Espelage, D. L. (2012). A review of research on bullying and peer victimization in school: An ecological system analysis. *Aggression and Violent Behavior*, *17*(4), 311–322. https://doi.org/10.1016/j.avb.2012.03.003

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hughes, K., & Coplan, R. J. (2010). Exploring processes linking shyness and academic achievement in childhood. *School Psychology Quarterly*, *25*(4), 213–222. https://doi.org/10.1037/a0022070

Huizink, A. C. (2012). Prenatal factors in temperament: The role of prenatal stress and substance use exposure. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 297-314). New York, NY, US: The Guilford Press.

Hymel, S., Rubin, K. H., Rowden, L., & LeMare, L. (1990). Children's peer relationships: Longitudinal prediction of internalizing and externalizing problems from middle to late childhood. *Child Development*, *61*(6), 2004-2021. https://doi.org/10.1111/j.1467-8624.1990.tb03582.x

Iyer, R. V., Kochenderfer-Ladd, B., Eisenberg, N., & Thompson, M. (2010). Peer victimization and effortful control: Relations to school engagement and academic achievement. *Merrill-Palmer Quarterly*, *56*(3), 361–387. https://doi.org/10.1353/mpq.0.0058

Jefferis, B. J., Nazareth, I., Marston, L., Moreno-Kustner, B., Bellon, J. A., Svab, I., … King, M. (2011). Associations between unemployment and major depressive disorder: Evidence from an international, prospective study (the predict cohort). *Social Science & Medicine (1982)*, *73*(11), 1627–1634. https://doi.org/10.1016/j.socscimed.2011.09.029

Juvonen, J., & Graham, S. (2014). Bullying in schools: The power of bullies and the plight of victims. *Annual Review of Psychology*, *65*(1), 159–185. https://doi.org/10.1146/annurev-psych-010213-115030

Kagan, J. (1989). The concept of behavioral inhibition to the unfamiliar. In J. S. Reznick (Ed.), *The John D. and Catherine T. MacArthur Foundation series on mental health and development. Perspectives on behavioral inhibition* (pp. 1-23). Chicago, IL, US: University of Chicago Press.

Kagan, J., Reznick, J. S., Clarke, C., Snidman, N., & Garcia-Coll, C. (1984). Behavioral inhibition to the unfamiliar. *Child Development*, *55*(6), 2212–2225. https://doi.org/10.2307/1129793

Karevold, E., Roysamb, E., Ystrom, E., & Mathiesen, K. S. (2009). Predictors and pathways from infancy to symptoms of anxiety and depression in early adolescence. *Developmental Psychology*, *45*(4), 1051–1060. https://doi.org/10.1037/a0016123

Katz, S. J., Conway, C. C., Hammen, C. L., Brennan, P. A., & Najman, J. M. (2011). Childhood social withdrawal, interpersonal impairment, and young adult depression: A mediational model. *Journal of Abnormal Child Psychology*, *39*(8), 1227–1238. https://doi.org/10.1007/s10802-011-9537-z

Keenan, K., Loeber, R., & Green, S. (1999). Conduct disorder in girls: A review of the literature. *Clinical Child and Family Psychology Review*, *2*(1), 3–19. https://doi.org/10.1023/A:1021811307364

Kelly, B. M., Schwartz, D., Gorman, A. H., & Nakamoto, J. (2008). Violent victimization in the community and children's subsequent peer rejection: The mediating role of emotion dysregulation. *Journal of Abnormal Child Psychology*, *36*(2), 175–185. https://doi.org/10.1007/s10802-007-9168-6

Kerr, M., Lambert, W. W., Stattin, H., & Klackenberg-Larsson, I. (1994). Stability of inhibition in a Swedish longitudinal sample. *Child Development*, *65*(1), 138–146. https://doi.org/10.1111/j.1467-8624.1994.tb00740.x

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., … Wang, P. S. (2009). The global burden of mental disorders: An update from the WHO World Mental Health (WMH) surveys. *Epidemiologia E Psichiatria Sociale*, *18*(1), 23–33. https://doi.org/10.1017/S1121189X00001421

Kessler, R. C., Petukhova, M., Sampson, N. A., Zaslavsky, A. M., & Wittchen, H.-U. (2012). Twelve-month and lifetime prevalence and lifetime morbid risk of anxiety and mood disorders in the United States. *International Journal of Methods in Psychiatric Research*, *21*(3), 169–184. https://doi.org/10.1002/mpr.1359

Kiel, E. J., & Buss, K. A. (2010). Maternal accuracy and behavior in anticipating children's responses to novelty: Relations to fearful temperament and implications for anxiety development. *Social Development*, *19*(2), 304–325. https://doi.org/10.1111/j.1467-9507.2009.00538.x

Kochanska, G., & Knaack, A. (2003). Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality*, *71*(6), 1087–1112. https://doi.org/10.1111/1467-6494.7106008

Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology*, *36*(2), 220–232. https://doi.org/10.1037/0012-1649.36.2.220

Kochanska, G., & Radke-Yarrow, M. (1992). Inhibition in toddlerhood and the dynamics of the child's interaction with an unfamiliar peer at age five. *Child Development*, *63*(2), 325–335. https://doi.org/10.2307/1131482

Kovacs, M., & Devlin, B. (1998). Internalizing disorders in childhood. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *39*(01), 47–63. https://doi.org/10.1111/1469-7610.00303

Kumpulainen, K., Rasanen, E., Henttonen, I., Almqvist, F., Kresanov, K., Linna, S. L., … Tamminen, T. (1998). Bullying and psychiatric symptoms among elementary school-age children. *Child Abuse & Neglect*, *22*(7), 705–717. https://doi.org/10.1016/s0145-2134(98)00049-0

Ladd, G. W. (2006). Peer rejection, aggressive or withdrawn behavior, and psychological maladjustment from ages 5 to 12: An examination of four predictive models. *Child Development*, *77*(4), 822–846. https://doi.org/10.1111/j.1467-8624.2006.00905.x

Ladd, G. W., Ettekal, I., & Kochenderfer-Ladd, B. (2019). Longitudinal changes in victimized youth's social anxiety and solitary behavior. *Journal of Abnormal Child Psychology*, *47*(7), 1211–1223. https://doi.org/10.1007/s10802-018-0467-x

Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1997). Classroom peer acceptance, friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment? *Child Development*, *68*(6), 1181–1197. https://doi.org/10.2307/1132300

Ladd, G. W., & Troop-Gordon, W. (2003). The role of chronic peer difficulties in the development of children's psychological adjustment problems. *Child Development*, *74*(5), 1344–1367. https://doi.org/10.1111/1467-8624.00611

Lee, A., & Hankin, B. L. (2009). Insecure attachment, dysfunctional attitudes, and low self-esteem predicting prospective symptoms of depression and anxiety during adolescence. *Journal of Clinical Child and Adolescent Psychology*, *38*(2), 219–231. https://doi.org/10.1080/15374410802698396

Leech, S. L., Larkby, C. A., Day, R., & Day, N. L. (2006). Predictors and correlates of high levels of depression and anxiety symptoms among children at age 10. *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*(2), 223–230. https://doi.org/10.1097/01.chi.0000184930.18552.4d

Lewinsohn, P. M., Gotlib, I. H., Lewinsohn, M., Seeley, J. R., & Allen, N. B. (1998). Gender differences in anxiety disorders and anxiety symptoms in adolescents. *Journal of Abnormal Psychology*, *107*(1), 109–117. https://doi.org/10.1037/0021-843X.107.1.109

Lonigan, C. J., Vasey, M. W., Phillips, B. M., & Hazen, R. A. (2004). Temperament, anxiety, and the processing of threat-relevant stimuli. *Journal of Clinical Child & Adolescent Psychology*, *33*(1), 8–20. https://doi.org/10.1207/S15374424JCCP3301_2

Mackinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research*, *39*(1), 99–99. https://doi.org/10.1207/s15327906mbr3901_4

Masten, A. S., Morison, P., & Pellegrini, D. S. (1985). A revised class play method of peer assessment. *Developmental Psychology, 21*(3), 523-533. http://dx.doi.org/10.1037/0012-1649.21.3.523

Masten, A. S., Roisman, G. I., Long, J. D., Burt, K. B., Obradović, J., Riley, J. R., … Tellegen, A. (2005). Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*, *41*(5), 733–746. https://doi.org/10.1037/0012-1649.41.5.733

McClelland, M. M., & Cameron, C. E. (2011). Self-regulation and academic achievement in elementary school children. *New Directions for Child and Adolescent Development*, *2011*(133), 29–44. https://doi.org/10.1002/cd.302

McDougall, P., & Vaillancourt, T. (2015). Long-term adult outcomes of peer victimization in childhood and adolescence: Pathways to adjustment and maladjustment. *The American Psychologist*, *70*(4), 300–310. https://doi.org/10.1037/a0039174

McLaughlin, K. A., & King, K. (2015). Developmental trajectories of anxiety and depression in early adolescence. *Journal of Abnormal Child Psychology*, *43*(2), 311–323. https://doi.org/10.1007/s10802-014-9898-1

Melegari, M. G., Nanni, V., Lucidi, F., Russo, P. M., Donfrancesco, R., & Cloninger, C. R. (2015). Temperamental and character profiles of preschool children with ODD, ADHD, and anxiety disorders. *Comprehensive Psychiatry*, *58*, 94–101. https://doi.org/10.1016/j.comppsych.2015.01.001

Merikangas, K. R., He, J., Burstein, M., Swanson, S. A., Avenevoli, S., Cui, L., … Swendsen, J. (2010). Lifetime prevalence of mental disorders in US adolescents: Results from the National Comorbidity Study-Adolescent Supplement (NCS-A). *JAACAP*, *49*(10), 980–989. https://doi.org/10.1016/j.jaac.2010.05.017

Mills, R. S. L., & Rubin, K. H. (1993). Socialization factors in the development of social withdrawal. In K.H. Rubin & J. Asendorpf (Eds.), *Social withdrawal, inhibition, and shyness in childhood* (pp. 127-158). Hillsdale, NJ: Erlbaum.

Muris, P., & Ollendick, T. H. (2005). The role of temperament in the etiology of child psychopathology. *Clinical Child and Family Psychology Review*, *8*(4), 271–289. https://doi.org/10.1007/s10567-005-8809-y

Murray, K. T., & Kochanska, G. (2002). Effortful control: Factor structure and relation to externalizing and internalizing behaviors. *Journal of Abnormal Child Psychology*, *30*(5), 503–514. https://doi.org/10.1023/A:1019821031523

Muthén, L. K., & Muthén, B. O. (1998-2017). Mplus User's Guide. Eighth Edition. Los Angeles, CA: Muthén & Muthén.

Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *47*(3-4), 395–422. https://doi.org/10.1111/j.1469-7610.2006.01612.x

Nolen-Hoeksema, S., & Girgus, J. S. (1994). The emergence of gender differences in depression during adolescence. *Psychological Bulletin*, *115*(3), 424–443. https://doi.org/10.1037/0033-2909.115.3.424

Oberle, E., & Schonert-Reichl, K. A. (2013). Relations among peer acceptance, inhibitory control, and math achievement in early adolescence. *Journal of Applied Developmental Psychology*, *34*(1), 45–51. https://doi.org/10.1016/j.appdev.2012.09.003

Oh, W., Rubin, K. H., Bowker, J. C., Booth-LaForce, C., Rose-Krasnor, L., & Laursen, B. (2008). Trajectories of social withdrawal from middle childhood to early adolescence. *Journal of Abnormal Child Psychology*, *36*(4), 553–566. https://doi.org/10.1007/s10802-007-9199-z

Oldehinkel, A. J., Hartman, C. A., Ferdinand, R. F., Verhulst, F. C., & Ormel, J. (2007). Effortful control as modifier of the association between negative emotionality and adolescents' mental health problems. *Development and Psychopathology*, *19*(2), 523–539. https://doi.org/10.1017/S0954579407070253

Olino, T. M., Durbin, C. E., Klein, D. N., Hayden, E. P., & Dyson, M. W. (2013). Gender differences in young children's temperament traits: Comparisons across observational and parent-report methods. *Journal of Personality*, *81*(2), 119–129. https://doi.org/10.1111/jopy.12000

Ollendick, T. H., Greene, R. W., Weist, M. D., & Oswald, D. P. (1990). The predictive validity of teacher nominations: A five-year follow up of at-risk youth. *Journal of Abnormal Child Psychology*, *18*(6), 699–713. https://doi.org/10.1007/BF01342755

Olson, S. L., & Rosenblum, K. (1998). Preschool antecedents of internalizing problems in children beginning school: The role of social maladaptation. *Early Education and Development*, *9*(2), 117–129. https://doi.org/10.1207/s15566935eed0902_1

Olweus, D. (1991). Bully/victim problems among schoolchildren: Basic facts and effects of a school-based intervention program. In D. Pepler & K. Rubin (Eds.), *The development and treatment of childhood aggression* (pp. 441–448). Hillsdale, NJ: Lawrence Erlbaum.

Ostrov, J. M. (2010). Prospective associations between peer victimization and aggression. *Child Development*, *81*(6), 1670–1677. https://doi.org/10.1111/j.1467-8624.2010.01501.x

Pedersen, S., Vitaro, F., Barker, E. D., & Borge, A. I. H. (2007). The timing of middle-childhood peer rejection and friendship: Linking early behavior to early-adolescent adjustment. *Child Development*, *78*(4), 1037–1051. https://doi.org/10.1111/j.1467-8624.2007.01051.x

Prior, M., Smart, D., Sanson, A., & Oberklaid, F. (2000). Does shy-inhibited temperament in childhood lead to anxiety problems in adolescence? *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*(4), 461–468. https://doi.org/10.1097/00004583-200004000-00015

Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: The early childhood behavior questionnaire. *Infant Behavior & Development*, *29*(3), 386–401. https://doi.org/10.1016/j.infbeh.2006.01.004

Rankin Williams, L., Degnan, K. A., Perez-Edgar, K. E., Henderson, H. A., Rubin, K. H., Pine, D. S., … Fox, N. A. (2009). Impact of behavioral inhibition and parenting style on internalizing and externalizing problems from early childhood through

adolescence. *Journal of Abnormal Child Psychology*, *37*(8), 1063–1075. https://doi.org/10.1007/s10802-009-9331-3

Rapee, R. M. (2014). Preschool environment and temperament as predictors of social and nonsocial anxiety disorders in middle adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *53*(3), 320–328. https://doi.org/10.1016/j.jaac.2013.11.014

Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: a meta-analysis of longitudinal studies. *Child Abuse & Neglect*, *34*(4), 244–252. https://doi.org/10.1016/j.chiabu.2009.07.009

Reynolds, C. R., & Kamphaus, R. W. (1998). *Behavior assessment system for children, manual*. Circle Pines, MN: American Guidance Service, Inc.

Rhoades, B. L., Greenberg, M. T., & Domitrovich, C. E. (2009). The contribution of inhibitory control to preschoolers' social-emotional competence. *Journal of Applied Developmental Psychology*, *30*(3), 310–320. https://doi.org/10.1016/j.appdev.2008.12.012

Rothbart, M. K. (1981). Measurement of temperament in infancy. *Child Development*, *52*(2), 569–578. https://doi.org/10.2307/1129176

Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development*, *72*(5), 1394–1408. https://doi.org/10.1111/1467-8624.00355

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In *Handbook of Child Psychology*. Retrieved from https://dx.doi.org/10.1002/9780470147658.chpsy0303

Rubin, K. (2001). *The Play Observation Scale.* College Park, MD: University of MD.

Rubin, K. H., & Asendorpf, J. B. (1993). Social withdrawal, inhibition, and shyness in childhood: Conceptual and definitional issues. In K. H. Rubin & J. B. Asendorpf (Eds.), *Social withdrawal, inhibition, and shyness in childhood* (pp. 3-17). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.

Rubin, K. H., & Barstead, M. G. (2014). Gender differences in child and adolescent social withdrawal: A commentary. *Sex Roles*, *70*(7-8), 274–284. https://doi.org/10.1007/s11199-014-0357-9

Rubin, K. H., Burgess, K., Kennedy, A. E., & Stewart, S. (2003). Social withdrawal and inhibition in childhood. In E. J. Mash & R. A. Barkley (Eds.), *Child Psychopathology* (pp. 372–406). New York: Guilford Press.

Rubin, K. H., Cheah, C. S. L., & Fox, N. (2001). Emotion regulation, parenting and display of social reticence in preschoolers. *Early Education and Development*, *12*(1), 97–115. https://doi.org/10.1207/s15566935eed1201_6

Rubin, K. H., Chen, X., McDougall, P., Bowker, A., & McKinnon, J. (1995). The Waterloo Longitudinal Project: Predicting internalizing and externalizing problems in adolescence. *Development and Psychopathology*, *7*(4), 751–764. https://doi.org/10.1017/S0954579400006829

Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual Review of Psychology*, *60*, 141–171. https://doi.org/10.1146/annurev.psych.60.110707.163642

Rubin, K. H., Hastings, P. D., Stewart, S. L., Henderson, H. A., & Chen, X. (1997). The consistency and concomitants of inhibition: Some of the children, all of the time. *Child Development*, *68*(3), 467–483. https://doi.org/10.1111/j.1467-8624.1997.tb01952.x

Rubin, K. H., Hymel, S., & Mills, R. S. L. (1989). Sociability and social withdrawal in childhood: Stability and outcomes. *Journal of Personality*, *57*(2), 237–255. https://doi.org/10.1111/j.1467-6494.1989.tb00482.x

Rubin, K. H., Root, A. K., & Bowker, J. (2010). Parents, peers, and social withdrawal in childhood: A relationship perspective. *New Directions for Child and Adolescent Development*, *2010*(127), 79–94. https://doi.org/10.1002/cd.264

Rueda, M. R., Posner, M. I., & Rothbart, M. K. (2005). The development of executive attention: Contributions to the emergence of self-regulation. *Developmental Neuropsychology*, *28*(2), 573–594. https://doi.org/10.1207/s15326942dn2802_2

Ryu, E. (2015). Multiple-group analysis approach to testing group difference in indirect effects. *Behavior Research Methods*, *47*(2), 484–493. https://doi.org/10.3758/s13428-014-0485-8

Schneider, B. H., Richard, J. F., Younger, A. J., & Freeman, P. (2000). A longitudinal exploration of the continuity of children's social participation and social withdrawal across socioeconomic status levels and social settings. *European Journal of Social Psychology*, *30*(4), 497–519. https://doi.org/10.1002/1099-0992(200007/08)30:4<497::AID-EJSP4>3.0.CO;2-0

Schoemaker, K., Mulder, H., Dekovic, M., & Matthys, W. (2013). Executive functions in preschool children with externalizing behavior problems: A meta-analysis. *Journal of Abnormal Child Psychology*, *41*(3), 457–471. https://doi.org/10.1007/s10802-012-9684-x

Schwartz, D., Lansford, J. E., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2015). Peer victimization during middle childhood as a lead indicator of internalizing problems and diagnostic outcomes in late adolescence. *Journal of Clinical Child & Adolescent Psychology*, *44*(3), 393–404. https://doi.org/10.1080/15374416.2014.881293

Sentse, M., Prinzie, P., & Salmivalli, C. (2017). Testing the direction of longitudinal paths between victimization, peer rejection, and different types of internalizing problems in adolescence. *Journal of Abnormal Child Psychology*, *45*(5), 1013–1023. https://doi.org/10.1007/s10802-016-0216-y

Shamir-Essakow, G., Ungerer, J. A., & Rapee, R. M. (2005). Attachment, behavioral inhibition, and anxiety in preschool children. *Journal of Abnormal Child Psychology*, *33*(2), 131–143. https://doi.org/10.1007/s10802-005-1822-2

Shanahan, L., Copeland, W., Costello, E. J., & Angold, A. (2008). Specificity of putative psychosocial risk factors for psychiatric disorders in children and adolescents. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *49*(1), 34–42. https://doi.org/10.1111/j.1469-7610.2007.01822.x

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: the development and validation of a new criterion Q-sort scale. *Developmental Psychology*, *33*(6), 906–916. https://doi.org/10.1037/0012-1649.33.6.906

Shiner, R. L., & DeYoung, C. G. (2013). The structure of temperament and personality traits: A developmental perspective. In P. D. Zelazo (Ed.), *Oxford library of psychology. The Oxford handbook of developmental psychology, Vol. 2. Self and other* (pp. 113-141). New York, NY, US: Oxford University Press.

Spinrad, T. L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C. L., Kupfer, A., … Hofer, C. (2007). Relations of maternal socialization and toddlers' effortful control to children's adjustment and social competence. *Developmental Psychology*, *43*(5), 1170–1186. https://doi.org/10.1037/0012-1649.43.5.1170

Sroufe, L. A., & Rutter, M. (1984). The domain of developmental psychopathology. *Child Development*, *55*(1), 17–29. https://doi.org/10.2307/1129832

Stewart, S. L., & Rubin, K. H. (1995). The social problem-solving skills of anxious-withdrawn children. *Development and Psychopathology*, *7*(2), 323–336. https://doi.org/10.1017/S0954579400006532

Stice, E., Ragan, J., & Randall, P. (2004). Prospective relations between social support and depression: Differential direction of effects for parent and peer support? *Journal of Abnormal Psychology*, *113*(1), 155–159. https://doi.org/10.1037/0021-843X.113.1.155

Stifter, C. A., Fox, N. A., & Porges, S. W. (1989). Facial expressivity and vagal tone in 5- and 10-month-old infants. *Infant Behavior and Development*, *12*(2), 127–137. https://doi.org/10.1016/0163-6383(89)90001-5

Stride, C. B., Gardner, S. E., Catley, N., & Thomas, F. (2015). Mplus code for mediation, moderation and moderated mediation models. Retrieved from http://www.figureitout.org.uk

Thapar, A., Collishaw, S., Pine, D. S., & Thapar, A. K. (2012). Depression in adolescence. *Lancet*, *379*(9820), 1056–1067. https://doi.org/10.1016/S0140-6736(11)60871-4

Thompson, R. S., & Leadbeater, B. J. (2013). Peer victimization and internalizing symptoms from adolescence into young adulthood: Building strength through emotional support. *Journal of Research on Adolescence*, *23*(2), 290–303. https://doi.org/10.1111/j.1532-7795.2012.00827.x

Toth, S. L., & Cicchetti, D. (2013). A developmental psychopathology perspective on child maltreatment. *Child Maltreatment*, *18*(3), 135–139. https://doi.org/10.1177/1077559513500380

van der Voort, A., Linting, M., Juffer, F., Bakermans-Kranenburg, M. J., Schoenmaker, C., & van IJzendoorn, M. H. (2014). The development of adolescents' internalizing behavior: Longitudinal effects of maternal sensitivity and child inhibition. *Journal of Youth and Adolescence*, *43*(4), 528–540. https://doi.org/10.1007/s10964-013-9976-7

Volbrecht, M. M., & Goldsmith, H. H. (2010). Early temperamental and family predictors of shyness and anxiety. *Developmental Psychology*, *46*(5), 1192–1205. https://doi.org/10.1037/a0020616

White, L. K., McDermott, J. M., Degnan, K. A., Henderson, H. A., & Fox, N. A. (2011). Behavioral inhibition and anxiety: The moderating roles of inhibitory control and attention shifting. *Journal of Abnormal Child Psychology*, *39*(5), 735–747. https://doi.org/10.1007/s10802-011-9490-x

Younger, A. J., Schwartzman, A. E., & Ledingham, J. E. (1985). Age-related changes in children's perceptions of aggression and withdrawal in their peers. *Developmental Psychology*, *21*(1), 70–75. https://doi.org/10.1037/0012-1649.21.1.70

Zhou, Q., Chen, S. H., & Main, A. (2012). Commonalities and differences in the research on children's effortful control and executive function: A call for an integrated model of self-regulation. *Child Development Perspectives*, *6*(2), 112–121. https://doi.org/10.1111/j.1750-8606.2011.00176.x

APPENDIX A

TABLES AND FIGURES

Table 1

Descriptive Statistics of Primary Measures and Covariates for Males

Variable	N	Mean	SD	Min.	Max.	Skewness	Kurtosis
SES at 4	185	40.86	10.39	14.00	66.00	-0.26	-0.03
Social Fear at 4	171	3.33	1.15	1.00	6.46	0.37	-0.49
Inhibitory Control at 4	171	4.35	0.75	2.46	6.39	-0.15	-0.20
Social Withdrawal at 10	121	50.23	10.63	39.00	90.00	1.47	2.07
Peer Victimization at 10	104	-0.06	0.99	-1.13	4.58	2.63	7.79
Internalizing at 15	130	46.51	11.37	34.00	83.00	1.30	1.44
Externalizing at 15	136	50.24	10.06	37.00	102.00	1.73	5.11
Peer Exclusion at 10	104	-0.13	1.04	-1.13	4.34	2.61	7.01

Table 2

Descriptive Statistics of Primary Measures and Covariates for Females

Variable	N	Mean	SD	Min.	Max.	Skewness	Kurtosis
SES at 4	215	38.87	11.31	14.00	66.00	-0.02	-0.60
Social Fear at 4	203	3.43	1.20	1.15	6.23	0.30	-0.66
Inhibitory Control at 4	203	4.66	0.72	2.46	6.15	-0.40	-0.13
Social Withdrawal at 10	149	49.75	10.59	39.00	100.00	1.96	4.97
Peer Victimization at 10	128	0.06	1.05	-1.75	5.52	2.16	6.34
Internalizing at 15	170	45.88	9.79	34.00	86.00	1.11	1.36
Externalizing at 15	170	49.52	11.69	37.00	102.00	1.81	3.94
Peer Exclusion at 10	128	-0.02	0.93	-1.49	4.71	2.13	5.97

Table 3

Correlation Coefficients for Demographic, Independent, and Dependent Variables for Males

Measure	1	2	3	4	5	6	7	8	9
1. Race	--								
2. SES at 4	-.29***	--							
3. Social Fear at 4	-.07	-.06	--						
4. Inhibitory Control at 4	.07	.16	.27***	--					
5 Social Withdrawal at 10	.03	-.23**	-.12	-.18	--				
6. Peer Victimization at 10	.01	-.07	-.09	-.06	.35***	--			
7. Internalizing at 15	.06	-.03	-.01	-.11	.29**	.07	--		
8. Externalizing at 15	.05	-.17*	.07	-.37***	.32**	-.02	.30**	--	
9. Peer Exclusion at 10	-.03	-.09	-.12	-.04	.45***	.87***	.06	.05	--

*$p < .05$, **$p < .01$, ***$p < .001$

Table 4

Correlation Coefficients for Demographic, Independent, and Dependent Variables for Females

Measure	1	2	3	4	5	6	7	8	9
1. Race	--								
2. SES at 4	-.18**	--							
3. Social Fear at 4	-.07	.01	--						
4. Inhibitory Control at 4	-.11	.02	.10	--					
5. Social Withdrawal at 10	-.02	-.10	-.03	-.20*	--				
6. Peer Victimization at 10	-.11	.01	-.15	-.33***	.44***	--			
7. Internalizing at 15	.00	-.01	-.14	-.23**	.25**	.32***	--		
8. Externalizing at 15	.09	-.20*	-.02	-.28***	.26**	.22**	.25**	--	
9. Peer Exclusion at 10	-.14	.02	-.06	-.30***	.51***	.81***	.35***	.18*	--

*$p < .05$, **$p < .01$, ***$p < .001$

Table 5

Unstandardized Estimates and 95% Bias-corrected Bootstrap Confidence Intervals for Indirect Effects in the Overcontrolled Model

Indirect Effects on Internalizing Symptoms	Unstandardized Estimates	Lower CI	Upper CI
Social fear → Social withdrawal → Internalizing symptoms	-.19	-.73	.11
Inhibitory control → Social withdrawal → Internalizing symptoms*	-.56	-1.24	-.14
Conditional Indirect Effects on Internalizing Symptoms for Boys			
Social Fear X Low Inhibitory Control → Social withdrawal → Internalizing symptoms	-.37	-1.79	.61
Social Fear X Average Inhibitory Control → Social withdrawal → Internalizing symptoms	-.41	-1.39	.18
Social Fear X High Inhibitory Control → Social withdrawal → Internalizing symptoms	-.46	-1.59	.13
Conditional Indirect Effects on Internalizing Symptoms for Girls			
Social Fear X Low Inhibitory Control → Social withdrawal → Internalizing symptoms	-.73	-2.28	.03
Social Fear X Average Inhibitory Control → Social withdrawal → Internalizing symptoms	-.13	-.94	.25
Social Fear X High Inhibitory Control → Social withdrawal → Internalizing symptoms	.46	.00	1.41

Note. *Indirect effect is statistically significant as the bias-corrected 95% confidence interval does not contain zero.

Table 6

Unstandardized Estimates and 95% Bias-corrected Bootstrap Confidence Intervals for Indirect Effects in the Undercontrolled Model

Indirect Effects on Internalizing Symptoms	Unstandardized Estimates	Lower CI	Upper CI
Social fear → Peer victimization → Internalizing symptoms	.20	-.87	.04
Inhibitory control → Peer victimization → Internalizing symptoms*	-.53	-1.48	-.04
Social Fear X Low Inhibitory Control → Peer victimization → Internalizing symptoms	-.24	-1.34	.20
Social Fear X Average Inhibitory Control → Peer victimization → Internalizing symptoms	-.20	-.87	.04
Social Fear X High Inhibitory Control → Peer victimization → Internalizing symptoms	-.17	-.89	.16

Note. *Indirect effect is statistically significant as the bias-corrected 95% confidence interval does not contain zero.

Table 7

Unstandardized Estimates and 95% Bias-corrected Bootstrap Confidence Intervals for Indirect Effects in the Overcontrolled Model when Controlling for Externalizing Symptoms

Indirect Effects on Internalizing Symptoms	Unstandardized Estimates	Lower CI	Upper CI
Social fear → Social withdrawal → Internalizing symptoms	-.15	-.64	.08
Inhibitory control → Social withdrawal → Internalizing symptoms*	-.42	-1.05	-.08
Conditional Indirect Effects on Internalizing Symptoms for Boys			
Social Fear X Low Inhibitory Control → Social withdrawal → Internalizing symptoms	-.30	-1.71	.31
Social Fear X Average Inhibitory Control → Social withdrawal → Internalizing symptoms	-.31	-1.29	.10
Social Fear X High Inhibitory Control → Social withdrawal → Internalizing symptoms	-.33	-1.44	.08
Conditional Indirect Effects on Internalizing Symptoms for Girls			
Social Fear X Low Inhibitory Control → Social withdrawal → Internalizing symptoms	-.59	-2.06	.03
Social Fear X Average Inhibitory Control → Social withdrawal → Internalizing symptoms	-.11	-.86	.20
Social Fear X High Inhibitory Control → Social withdrawal → Internalizing symptoms	.38	-.01	1.26

Note. *Indirect effect is statistically significant as the bias-corrected 95% confidence interval does not contain zero.

Table 8

Unstandardized Estimates and 95% Bias-corrected Bootstrap Confidence Intervals for Indirect Effects in the Undercontrolled Model when Controlling for Externalizing Symptoms.

Indirect Effects on Internalizing Symptoms	Unstandardized Estimates	Lower CI	Upper CI
Social fear → Peer victimization → Internalizing symptoms	-.17	-.81	.03
Inhibitory control → Peer victimization → Internalizing symptoms*	-.42	-1.29	-.01
Social Fear X Low Inhibitory Control → Peer victimization → Internalizing symptoms	-.21	-1.28	.13
Social Fear X Average Inhibitory Control → Peer victimization → Internalizing symptoms	-.17	-.82	.03
Social Fear X High Inhibitory Control → Peer victimization → Internalizing symptoms	-.14	-.84	.11

*Note.**Indirect effect is statistically significant as the bias-corrected 95% confidence interval does not contain zero.

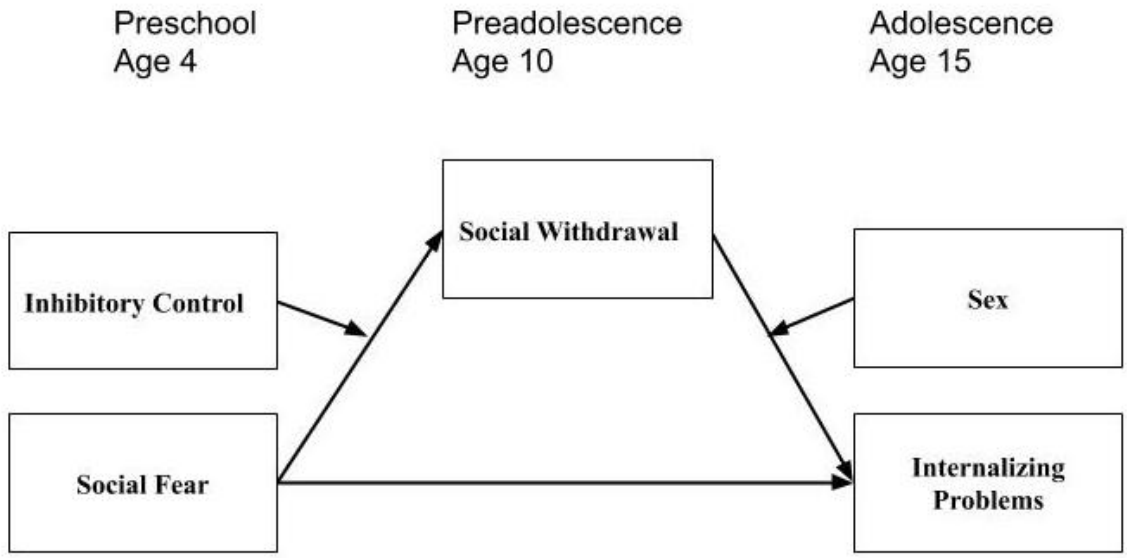

Figure 1. Theoretical Overcontrolled Model.

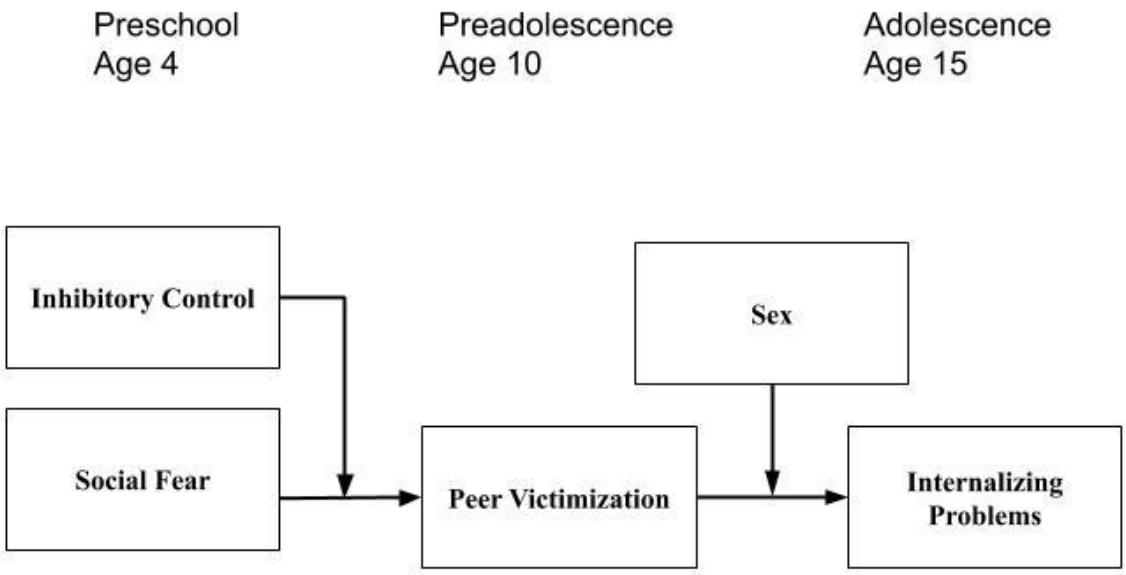

Figure 2. Theoretical Undercontrolled Model.

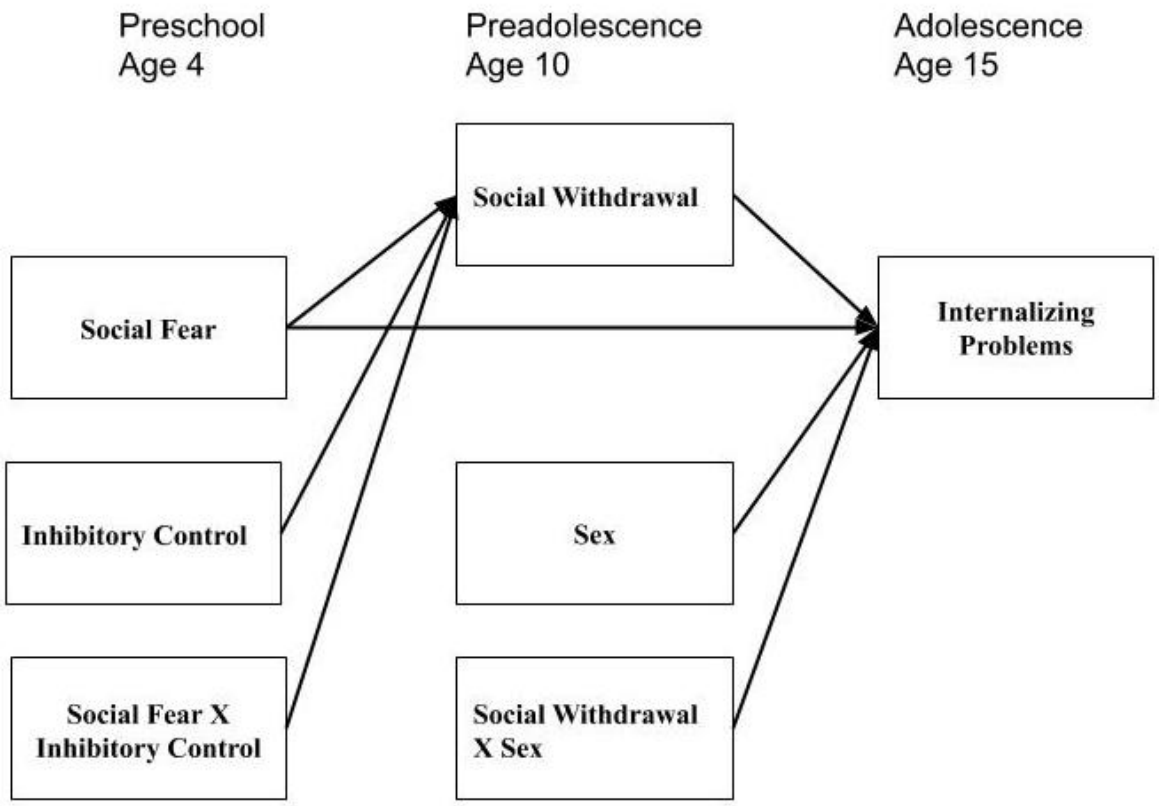

Figure 3. Statistical Overcontrolled Model.

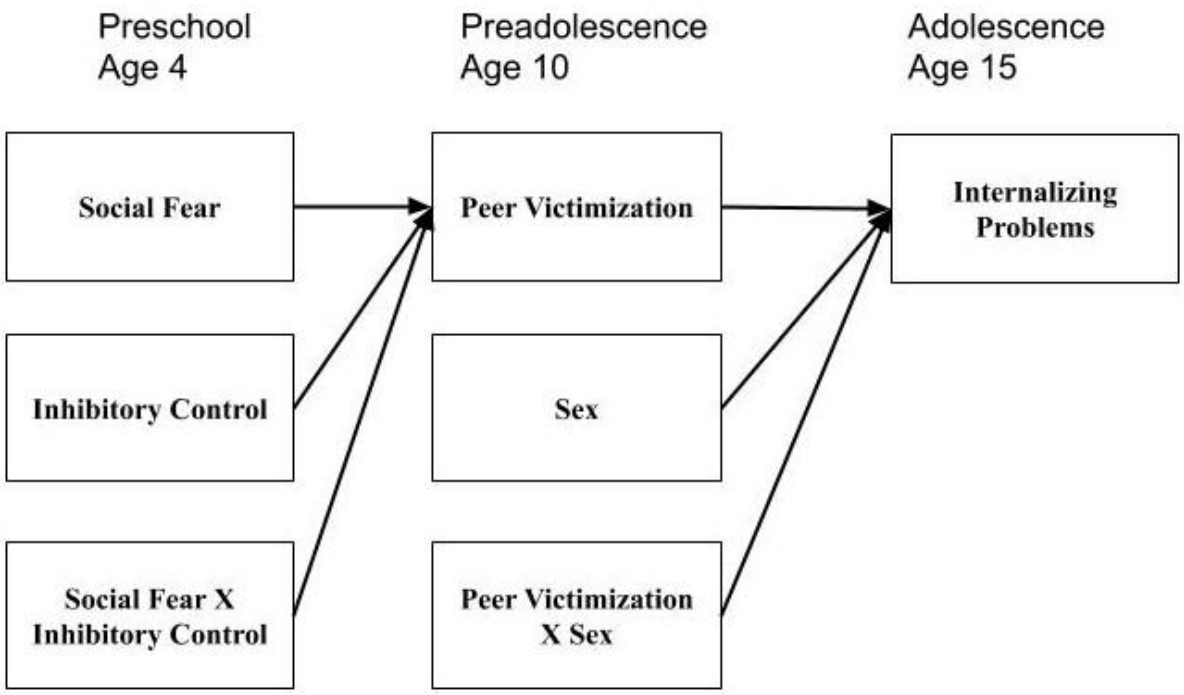

Figure 4. Statistical Undercontrolled Model.

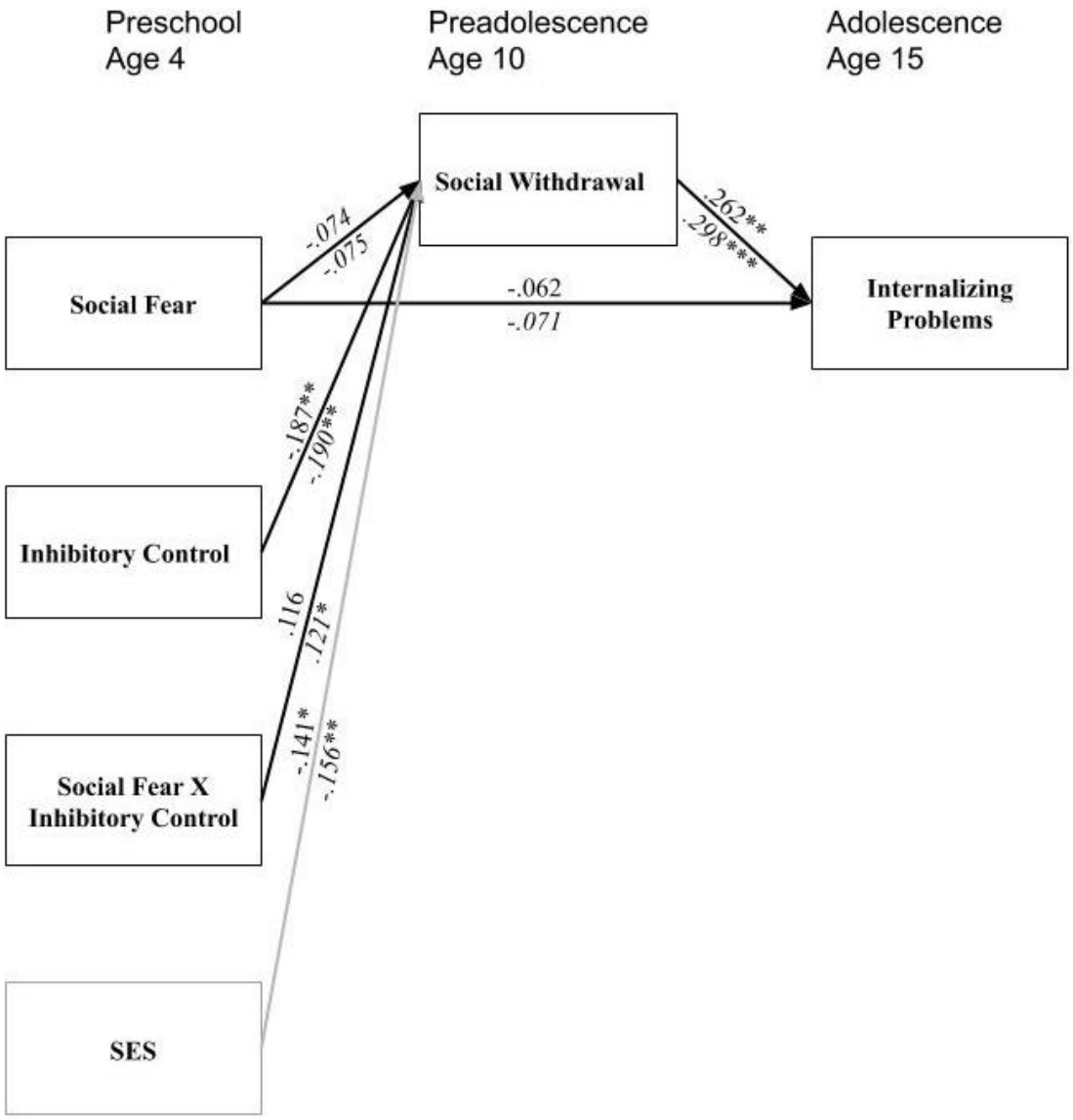

Figure 5. Overcontrolled Fully Constrained Model with Standardized Path Coefficients.

Note. Standardized parameter estimates for females are in italics and below the illustrated path lines. *$p < .05$, **$p < .01$, ***$p < .001$.

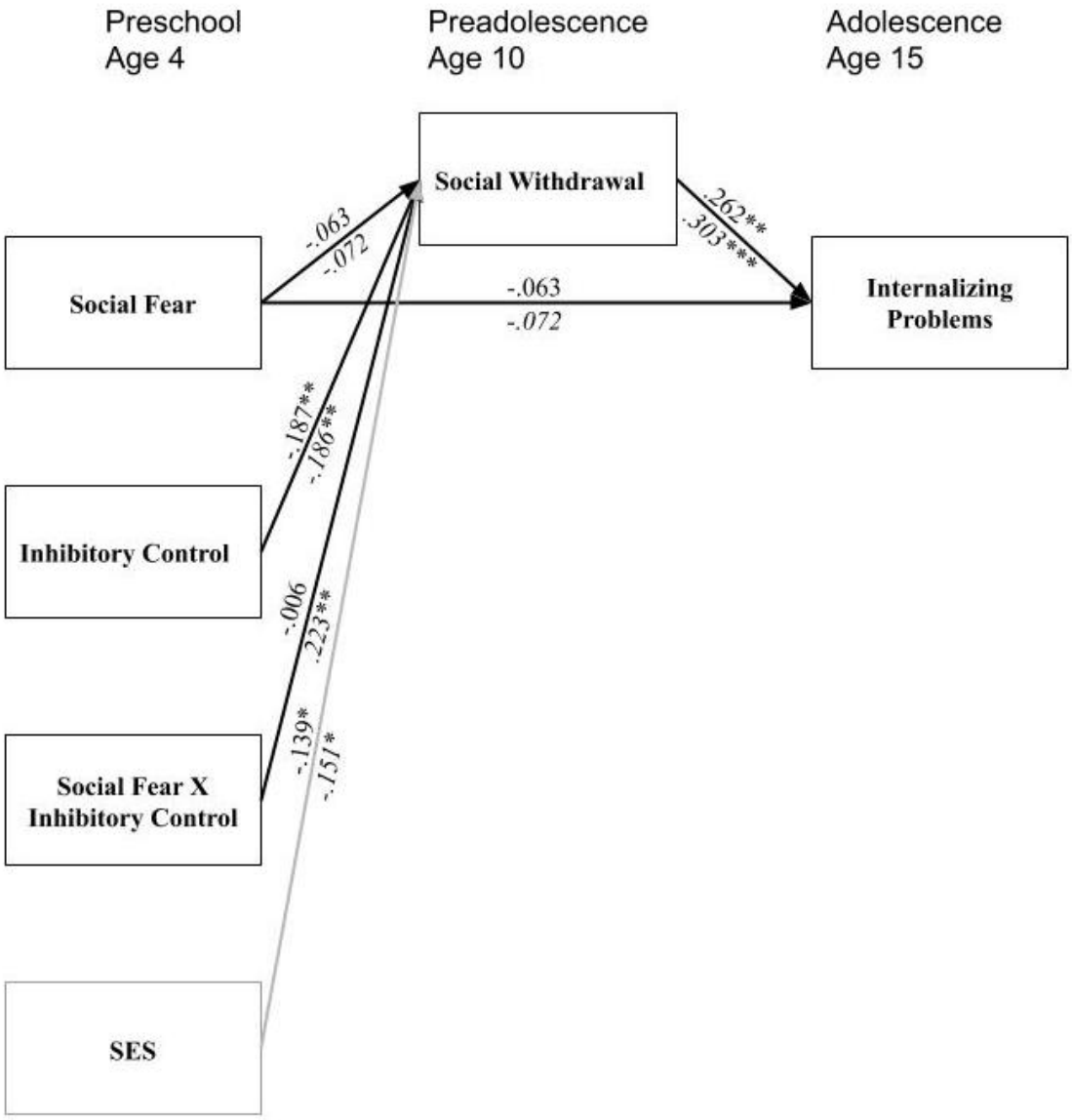

Figure 6. Overcontrolled Baseline Model with Social Fear X Inhibitory Control Parameter Free to be Estimated with Standardized Path Coefficients.

Note. Standardized parameter estimates for females are in italics and below the illustrated path lines. *$p < .05$, **$p < .01$, ***$p < .001$.

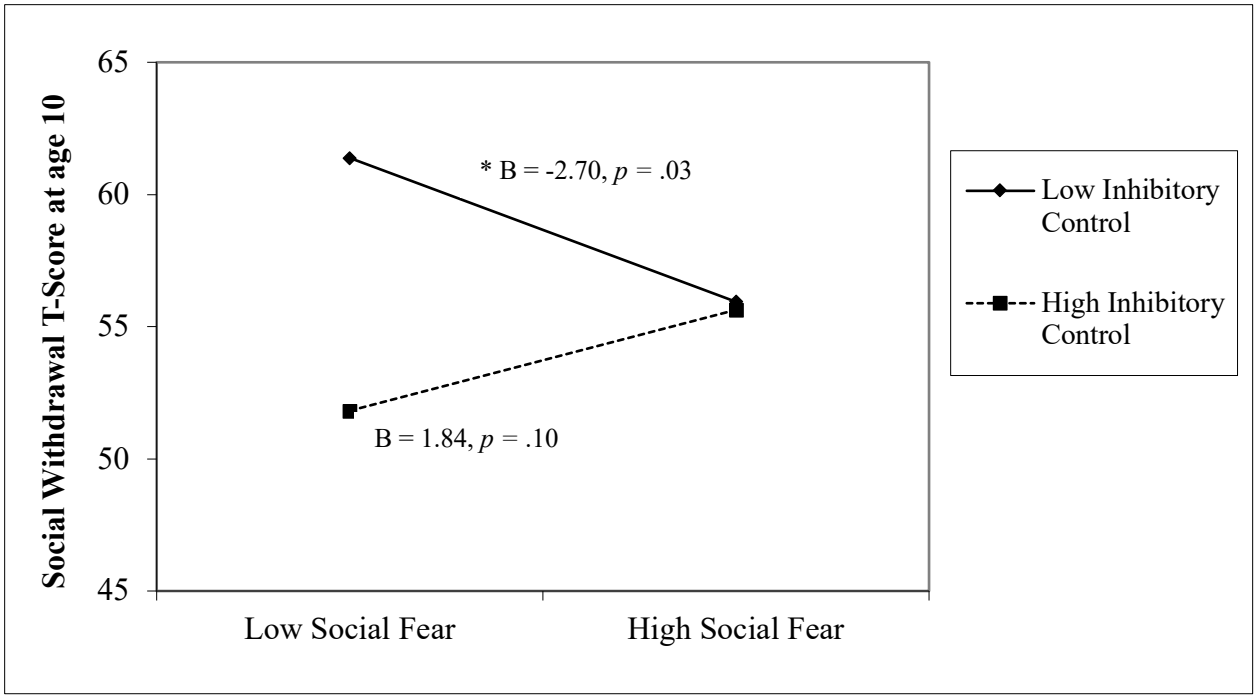

Figure 7. Graph of Simple Slopes of Interaction between Social Fear and Inhibitory Control for Females.

Note. Asterisk indicates the slope is statistically significant at the $p < .05$ level for females with low inhibitory control (1 standard deviation below the mean).

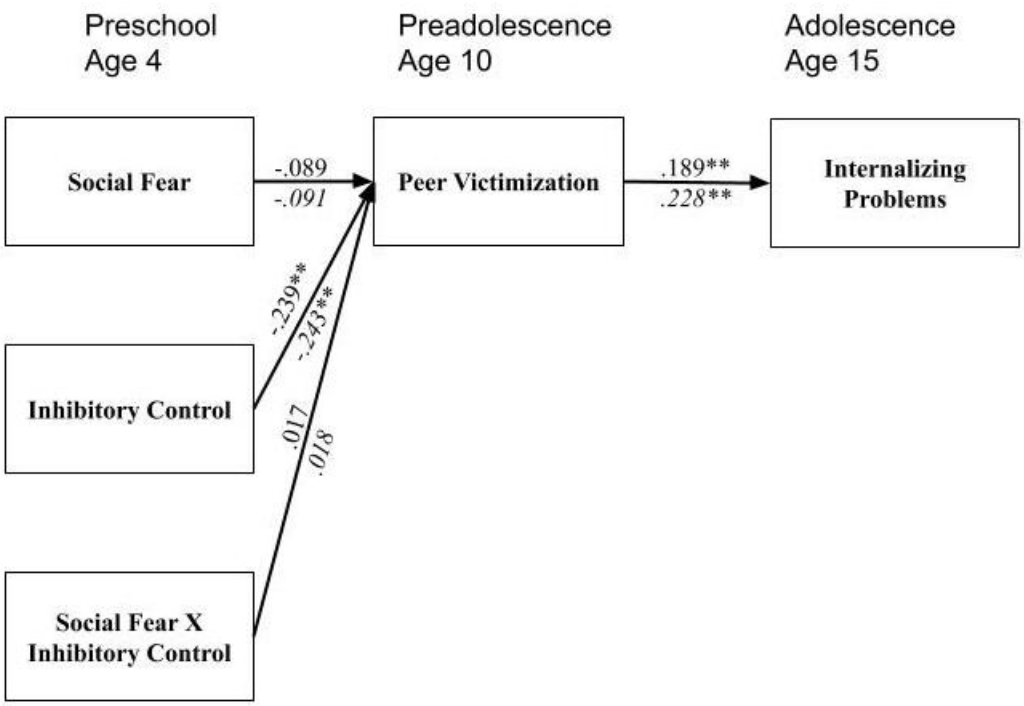

Figure 8. Undercontrolled Fully Constrained Model with Standardized Path Coefficients.

Note. Standardized parameter estimates for females are in italics and below the illustrated path lines. *$p < .05$, **$p < .01$.

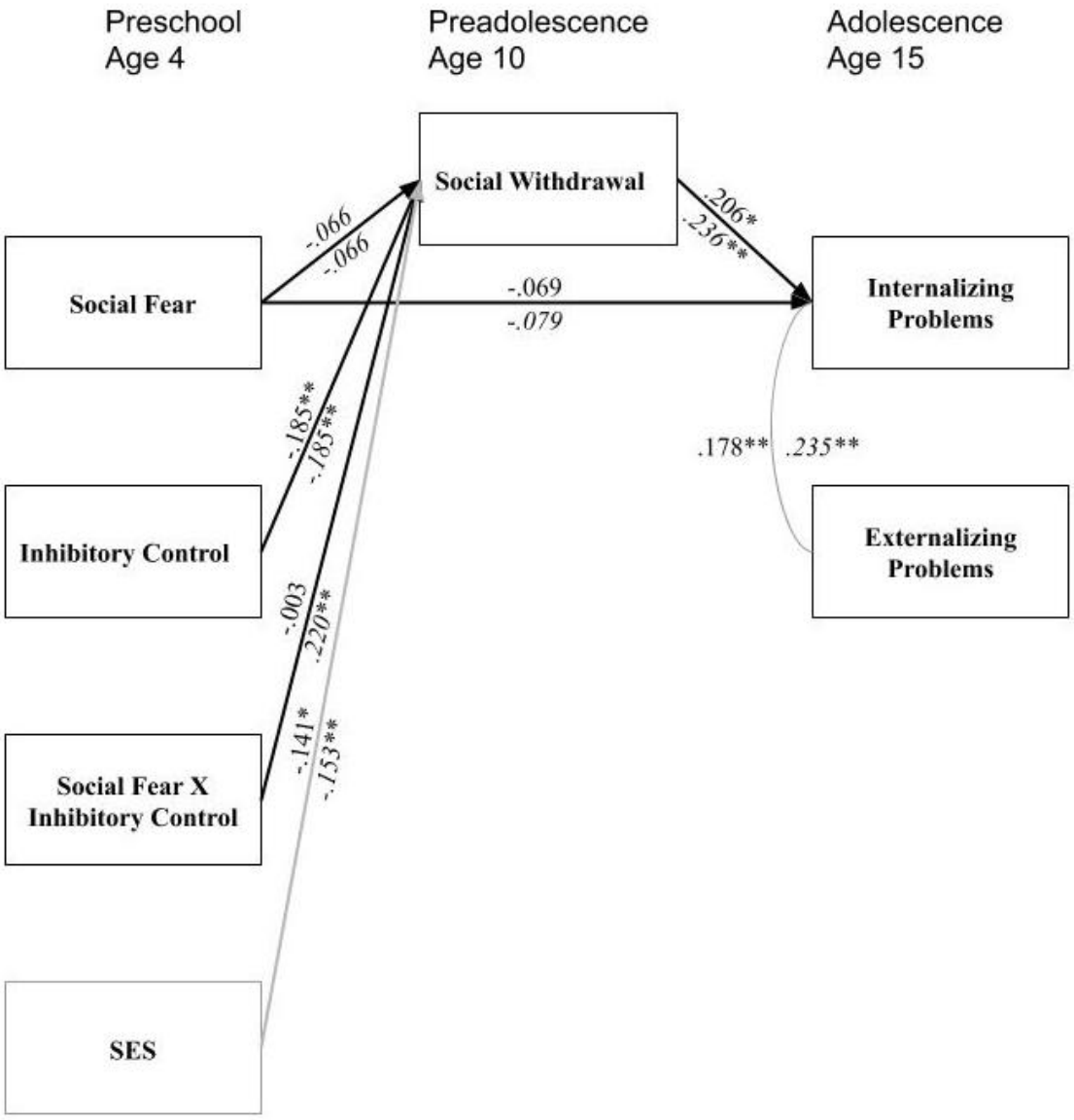

Figure 9. Overcontrolled Baseline Model with Social Fear X Inhibitory Control Parameter Free to be Estimated with Standardized Path Coefficients while Controlling for Externalizing Symptoms at 15 year.

Note. Standardized parameter estimates for females are in italics and below the illustrated path lines. *$p < .05$, **$p < .01$.

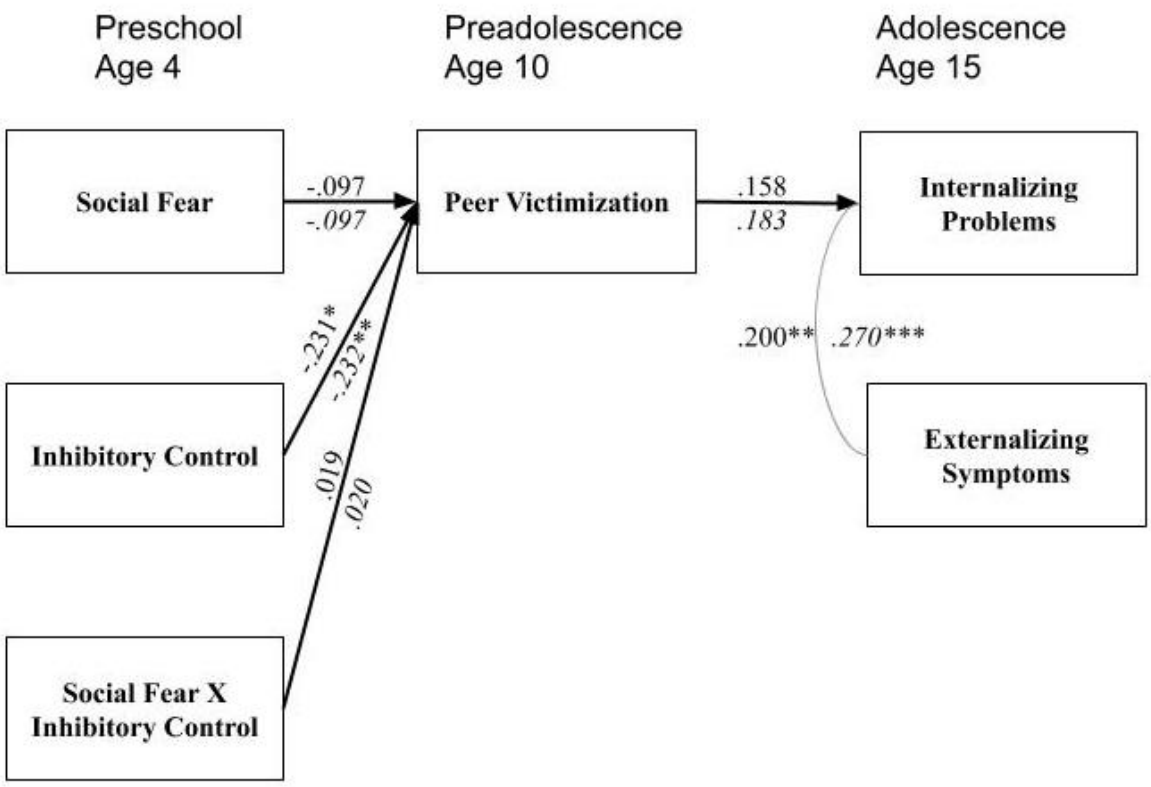

Figure 10. Undercontrolled Fully Constrained Model with Standardized Path Coefficients while Controlling for Externalizing Symptoms at 15 year.

Note. Parameter estimates for females are in italics and below the illustrated path line. *$p < .05$, **$p < .01$, ***$p < .001$.

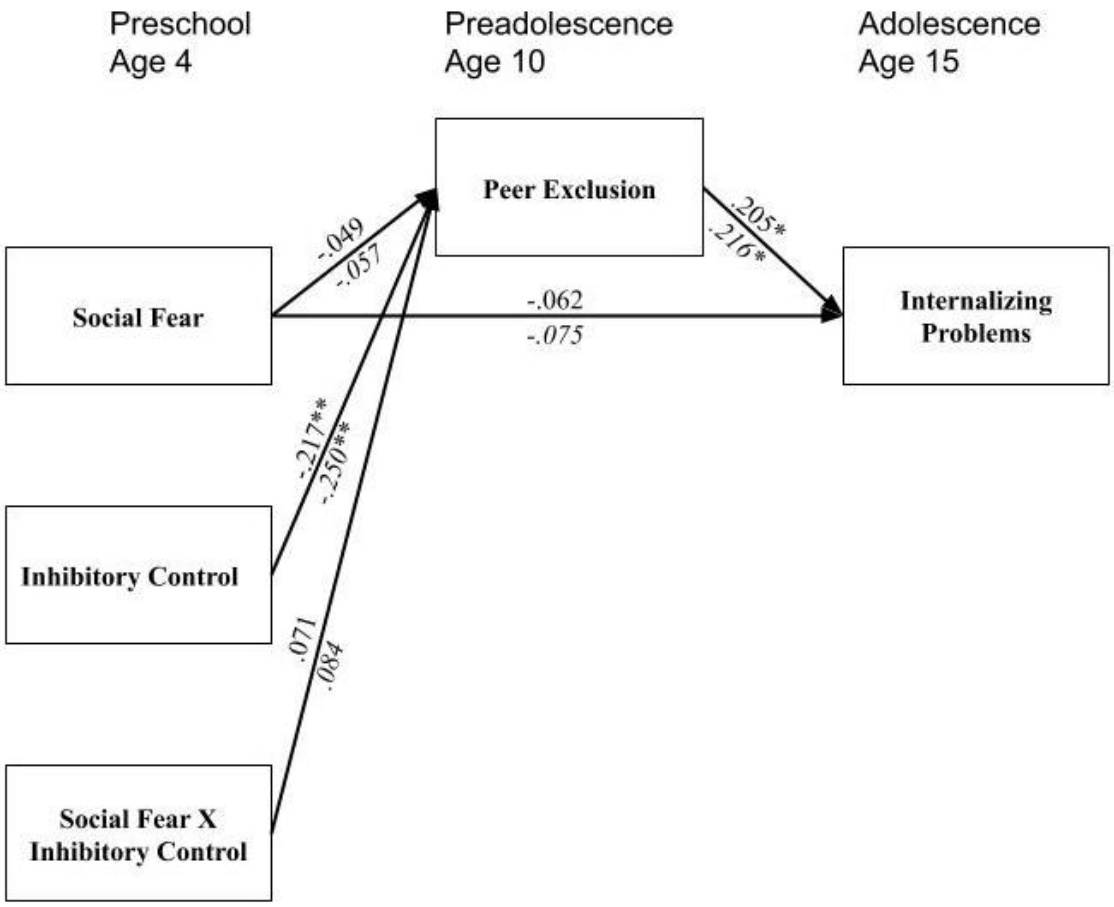

Figure 11. Peer Exclusion Fully Constrained Model with Standardized Path Coefficients.

Note. Standardized parameter estimates for females are in italics and below the illustrated path line. *$p < .05$, **$p < .01$, ***$p < .001$.

APPENDIX B

CBQ-LF: SHYNESS SUBSCALE

7. Sometimes prefers to watch rather than join other children playing

17. Is comfortable in situations where s/he will be meeting others (R)

23. Seems to be at ease with almost any person (R)

37. Gets embarrassed when strangers pay a lot of attention to him/her

45. Acts very friendly and outgoing with new children (R)

57. Joins others quickly, even when they are strangers (R)

74. Is sometimes shy even around people s/he has known a long time

89. Sometimes seems nervous when talking to adults s/he has just met

106. Acts shy around new people

119. Is comfortable asking other children to play (R)

129. Talks easily to new people (R)

143. Sometimes turns away shyly from new acquaintances

158. Seems completely at ease with almost any group (R)

(R) = Reverse Coded

APPENDIX C

CBQ-LF: INHIBITORY CONTROL SUBSCALE

4. Can lower his/her voice when asked to do so

20. Is good at games like “Simon says” “Mother, May I”

32. Has a hard time following instructions (R)

63. Prepares for trips and outings by planning things s/he will need

75. Can wait before entering into new activities if s/he is asked to

93. Has difficulty waiting in line for something (R)

108. Has trouble sitting still when s/he is told to (movies, church, etc) (R)

116. Is able to resist laughing or smiling when it isn’t appropriate

136. Is good at following instructions

147. Approaches dangerous places slowly and cautiously

162. Is not very careful and cautious in crossing streets (R)

168. Can easily stop an activity when s/he is told “no”

185. Is able to resist temptation when told s/he is not supposed to do something

(R) = Reverse Coded

APPENDIX D

BASC-TRS: WITHDRAWAL SUBSCALE

14. Refuses to talk.

28. Avoids competing with other children.

51. Plays alone.

65. Avoids other children.

88. Is chosen last by other children for games.

102. Has trouble making new friends.

125. Is shy with adults.

139. Refuses to join group activities.

APPENDIX E

BASC-SRP-A: SAD TRIAD

3. Nothing goes my way.

8. I used to be happier.

11. I can never seem to relax.

20. I worry about little things.

21. Nothing is fun anymore.

26. My friends have more fun than I do.

33. Nobody ever listens to me.

38. I just don't care anymore.

41. I worry a lot of the time.

50. I often worry about something bad happening to me.

51. I don't seem to do anything right.

56. Other children are happier than I am.

63. Nothing ever goes right for me.

68. Nothing about me is right.

71. I get so nervous I can't breathe.

75. People say bad things to me.

80. I worry when I go to bed at night.

81. I feel like my life is getting worse and worse.

86. People act as if they don't hear me.

93. I feel depressed.

98. No one understands me.

101. I feel guilty about things.

105. I am lonely.

108. I get nervous.

110. I worry but I don't know why.

111. I feel sad.

116. I am left out of things.

131. I get nervous when things do not go the right way for me.

135. Other people find things wrong with me.

138. Little things bother me.

140. I worry about what is going to happen.

146. I feel out of place around people.

170. I am afraid of a lot of things.

APPENDIX F

BASC-PRS-A: EXTERNALIZING SYMPTOMS

4. Calls other adolescents names.

10. Annoys others on purpose.

13. Uses foul language.

15. Cannot wait to take turn.

19. Steals.

20. Acts without thinking.

29. Drinks alcoholic beverages.

34. Teases others.

40. Threatens to hurt others.

43. Sneaks around.

45. Has poor self-control.

49. Smokes or chews tobacco.

50. Interrupts parents when they are talking on the phone.

59. Is in trouble with the police.

64. Argues when denied own way.

70. Hits other adolescents.

73. Breaks the rules.

75. Acts out of control.

79. Lies.

80. Interrupts others when they are speaking.

89. Gets in trouble.

94. Bullies others.

100. Loses temper too easily.

103. Uses illegal drugs.

105. Fiddles with things while at meals.

109. Breaks the rule just to see what will happen.

119. Deceives others.

124. Seeks revenge on others.

130. Is cruel to others.

133. Disobeys.

135. Disrupts other adolescents' activities.

139. Lies to get out of trouble